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THE JOURNAL

OF THE

American Medical Association

Annual Subscription, $5.00 | PUBLISHED WEEKLY | Single Copies, 15 Cents

VOLUME 71, No. 17 | 535 North Dearborn Street, CHICAGO, ILL. | OCTOBER 26, 1918

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Entered as Second-Class Matter, June 25, 1885, at the Postoffice at Chicago, Illinois, under Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized on June 14, 1918.
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The Journal of the American Medical Association

Published Under the Auspices of the Board of Trustees

VOL. 71, No. 17 — CHICAGO, ILLINOIS — OCTOBER 26, 1918

THE RETROGRADE MOVEMENT OF URETERAL CALCULI

HERMAN L. KRETSCHMER, M.D.

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CHICAGO

The advent of the roentgen ray marks the beginning of the period which is rightly characterized as the period of accurate and intelligent treatment of ureteral calculi. The roentgen ray, while contributing so largely to the diagnosis and treatment of this condition, is also accompanied by certain sources of error, chief of which are: (1) failure to demonstrate a calculus when present; (2) a wrong interpretation of shadows found in the plate, and (3) failure to find at operation a calculus which was definitely demonstrated by the roentgen ray to be in a "given portion" of the ureter.

1. With improved technic, failure to demonstrate the presence of a stone when present now makes up a very small percentage of cases. This small percentage can be still further reduced by subsequent examinations with the roentgen ray, by a careful rereading of the plates, by intra-ureteral injections of colloidal silver salts, and by the use of wax-tipped catheters.

2. Wrong interpretations of shadows found on the plates have been the cause of "unnecessary operations," and still lead to them. Thanks to the introduction of the shadowgraph catheter and to ureteropyelography, these extra-ureteral shadow-producing bodies are no longer a source of wrong diagnosis, thus making it possible to avoid unnecessary operations. The nature and origin of these bodies have been described so many times that it is not necessary here to enter into a detailed discussion of them. There is still a very small percentage of cases in which the source of error consists in the passing of a shadowgraph catheter, localizing the stone or suspected stone shadow thereby, and yet finding no stone at operation. Another source of error consists in the fact that the shadow, while extra-ureteral, lies in the same plane as the shadowgraph catheter. To overcome this error, stereoscopic plates should be made in all doubtful cases.[1] Still another source of error will be considered under the next heading, on the failure to demonstrate at operation a calculus which was definitely demonstrated by roentgen ray in a given portion of the ureter.

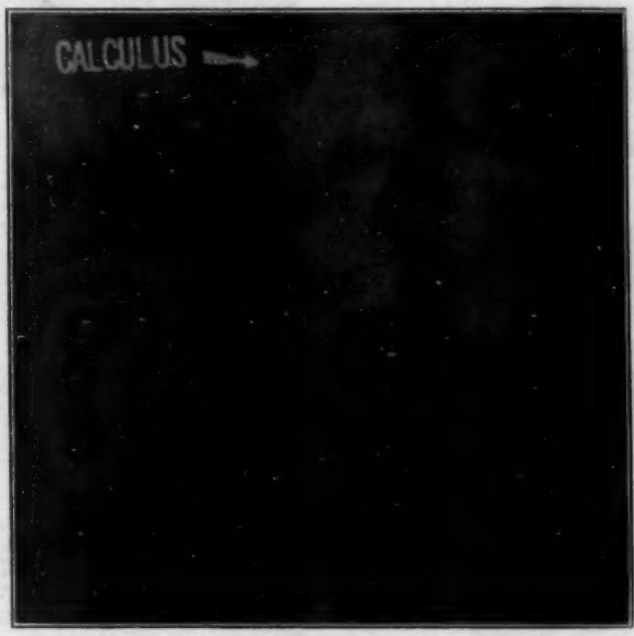

Fig. 1 (Case 1).—Calculus in left ureter, May 7, 1917.

3. There has been introduced into this topic another phase equally important as the ones just discussed, if not more important, because occasionally it results in an operation that fails to relieve the patient of the calculus. I refer to a condition which, for want of a better term, may be designated as the retrograde movement of ureteral calculi.

The circumstances are generally about as follows, in the order of their sequence:

The patient has symptoms and signs of stone in the ureter.

This is verified by the roentgen ray and the shadowgraph catheter.

The patient is operated on and no stone is found at the location in which a stone shadow was seen on the roentgenogram.

Further roentgenograms show that the stone has wandered back up the ureter or perhaps back into the kidney, excluding that group of cases in which the stone has wandered down the ureter or into the bladder and which are not to be considered in this paper.

This sequence of events may also occur following the observation and treatment of stone in the ureter by means of intra-ureteral manipulations with the ureteral catheter and the intra-ureteral injections of oil, glycerin, papaverin, etc.

Owing to the fact that I narrowly escaped this error, namely, of operating on the wrong part of the ureter, in one case, and because I saw the same phenomenon occur in a case under treatment without operation, and for the purpose of calling attention to this all-impor-

1. Recently we have used a new procedure which consists of making a double exposure on a single plate. The technic for this procedure is fully described in: Kretschmer, H. L.: A New Method for the Localization of Ureteral Calculi, Surg., Gynec. and Obst., to be published.

tant fact, thereby possibly preventing others from falling into the same trap, I shall report two cases.

REPORT OF CASES

Case 1.—*History.*—A man aged 50, referred to me by Dr. Clifford McCullough, entered the Presbyterian Hospital, May 7, 1917, complaining of pain in his left side. This pain was first noticed about 1 p. m., May 5, and was dull in the beginning and later colicky in type. It radiated along the course of the ureter and into the scrotum. By 6 p. m. he had a chill and his temperature began to rise. Alternating periods of chill, fever and perspiration continued for forty-eight hours, when he was taken to the hospital. During this time the output of urine was scanty.

Fourteen years before the patient had had a severe attack of ptomain poisoning. In 1906 he consulted Dr. Frank Billings. At that time no stone was found in the urinary tract and a diagnosis of pyelitis was made. Since then he has had varying forms of treatment, and was sent abroad for the cure of Bright's disease. In 1907 he had another severe attack, lasting six weeks.

The last attack of renal colic occurred four weeks before I saw him and lasted for twenty hours. During some of the attacks he had severe spells of hiccup, one of which lasted for four days.

Seven years ago the patient passed a small stone.

The patient denied all specific infection. His habits were moderate. He used alcohol and tobacco only occasionally, and his diet was rigidly meat-free for years.

Examination.—The patient was well nourished and of good color. He suffered considerable pain. The pupils were equal and reacted to light and accommodation. The neck, lungs and heart were negative. The liver was palpable on deep inspiration, and there was considerable tenderness over the region of the left kidney and ureter. The kidneys and spleen were not palpable. The genitalia were negative and the reflexes were normal.

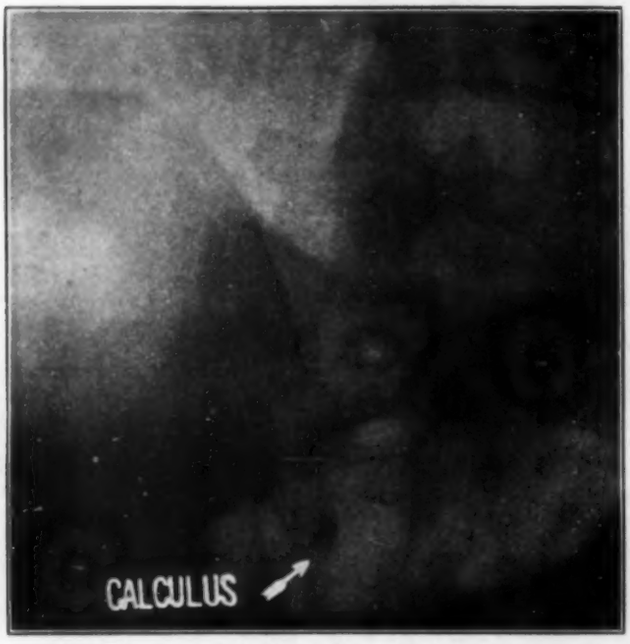

Fig. 2 (Case 1).—Calculus below brim of pelvis, May 18, 1917.

The urine was turbid; albumin was ++; there was no sugar, no acetone, no blood, no casts nor red cells; pus was present in large amount.

Blood examination revealed 5,560,000 red cells and 22,000 leukocytes. The systolic blood pressure was 130 and the diastolic 70.

Roentgenoscopy revealed a calculus in the left ureter at the level of the fourth lumbar vertebra (Fig. 1).

On cystoscopic examination the bladder was negative except for a slight amount of congestion around the internal urethral orifice. Both ureteral orifices were normal. Because of the large size of the stone, it was thought advisable to increase the size of the left ureteral orifice. Therefore, the left ureteral orifice was slit with the scissors, introduced through the operating cystoscope. A ureteral catheter was passed until an obstruction was met high up in the ureter, and 20 c.c. of sterile oil were injected.

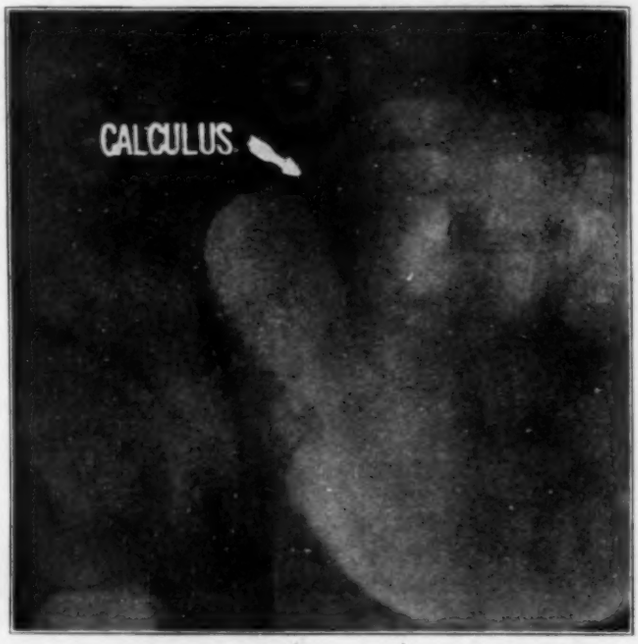

Fig. 3 (Case 1).—Calculus over edge of sacrum, May 27, 1917.

Treatment and Course.—Following the cystoscopy, the patient became very toxic and had a chill which lasted twenty minutes and a temperature of 103; he was somewhat irrational. This was followed by hiccup, which lasted five days.

At a phenolsulphonephthalein test, June 10, the appearance time was eight and one-half minutes; the output for the first hour was 18 per cent., and for the second hour, 20 per cent.

From May 19 to June 21, the patient received a total of four injections of sterile olive oil into the left ureter, the amounts varying from 15 to 25 c.c. During this time he also received four injections of a 2 per cent. solution of papaverin hydrochlorid.

The patient left the hospital, June 19, very much improved.

A series of roentgenograms, made at various dates from May 7, 1917, to Feb. 5, 1918, show that the calculus, during the intra-ureteral treatment, wandered from a position opposite the third lumbar vertebra down into the pelvis, so that it was seen lying along the margin of the sacrum (Fig. 4). Just before the patient left the hospital, another roentgenogram was made; this showed that the stone had wandered back up the ureter so that it lay opposite the transverse process of the fourth lumbar vertebra.

Two subsequent roentgenograms, one made Aug. 8, 1917, and one Feb. 5, 1918, showed the stone in approximately the same position as it was when the patient left the hospital.

From a review of this series of roentgenograms (Figs. 1, 2, 3, 4, 5, 6 and 7), it is evident that the stone wandered from the lumbar portion of the ureter into the pelvic portion and subsequently wandered back up into the lumbar portion of the ureter. These roentgenograms, however, did not show the lowest position which the stone attained, for at one of the ureteral catheterizations the catheter met an obstruction about 1 inch above the ureteral orifice.

Case 2.—*History.*—A physician, Dr. Z., aged 38, had an attack of renal colic fourteen years before, associated with pain in the penis and testicles, during which time he passed two small kidney stones. In the summer of 1914 he again

noticed some blood in the urine. In 1915 he had a very severe hemorrhage, passing about a pint of port wine colored urine without any pain; he also passed a great many large clots. The hematuria has been more or less continuous ever since; at times the urine was clear for a few days. The last attack of hematuria occured a week before his admittance, Aug. 14, 1917. He also complained of pain in the left groin. This was so distinct that he could put his finger on the spot, and at times was so severe that he was obliged to take morphin. The only urinary symptom was that of pain, which was always present at the end of urination. The patient had a backache, which was dull in character and aggravated by standing.

Examination.—The general physical examination was completely negative.

Examination of the urine revealed an alkaline reaction, specific gravity 1.020, albumin +, blood +, and no sugar. Microscopic examination revealed pus cells and red blood cells.

A roentgenogram, made by Dr. H. E. Potter, disclosed the presence of a stone in the left ureter, near the junction of the ureter with the bladder (Fig. 8). The kidneys were negative.

Cystoscopic examination revealed the bladder and ureteral orifices normal.

Treatment and Course.—At ureteral catheterization the ureteral catheter met an obstruction 1 inch above the ureteral orifice. Because of the low lying position of the stone, as verified by roentgenoscopy and obstruction to the catheter, it was decided to slit the ureteral orifice with the operating scissors and to inject papaverin and oil into the ureter. In all, the patient received three injections of oil and papaverin without the position of the stone changing.

In view of the fact that the stone failed to respond to this treatment, and because of the subjective symptoms, which were enough to interfere with the patient's occupation, it was decided to operate. I had planned to perform a suprapubic cystotomy and remove the stone transvesically. Just before the patient was taken to the operating room, another roentgenogram showed the stone lying between the fourth and fifth lumbar vertebrae (Fig. 9).

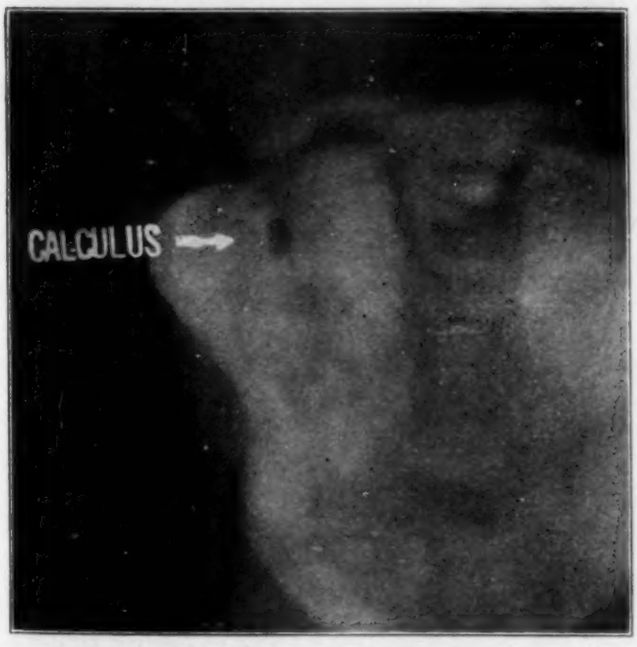

Fig. 4 (Case 1).—Calculus at edge of sacrum, June 1, 1917.

From these pictures, made Aug. 14 and Oct. 5, 1917, it is clear that the calculus wandered back up the ureter from a point just outside the bladder to a point in the lumbar portion of the ureter between the fourth and fifth lumbar vertebrae.

I removed the stone by an extraperitoneal ureterotomy. This precautionary measure of taking a roentgenogram just before the patient received the anesthetic prevented my carrying out the operation originally planned, namely, a suprapubic operation, which, had it been carried out, would not have been successful under the circumstances.

COMMENT

The question that most naturally arises from the experience of having two cases of retrograde move-

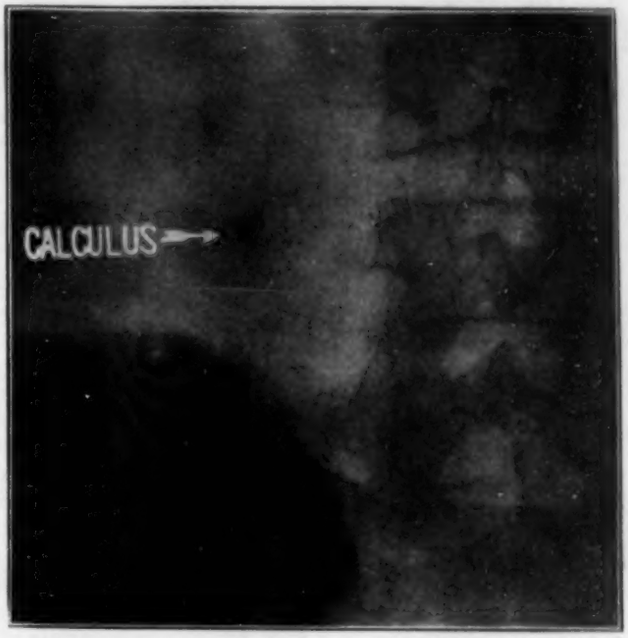

Fig. 5 (Case 1).—Calculus opposite fourth lumbar vertebra, June 19, 1917.

ment of ureteral stone is, How is it possible for a stone to wander back up the ureter for a varying distance or even to wander back into the renal pelvis?

Two possibilities at once suggest themselves:

1. In the first group of cases the ureter is dilated, either as the result of the presence of the stone or of some other pathologic condition, as stricture, to such a degree as to permit the stone to fall about at will, so that when the patient is erect the stone will lie in the lowest part of the ureter, and when the patient is placed on his back or in the Trendelenburg position, the stone falls "up" the dilated ureter for a variable distance or may even be found in the kidney pelvis.

This explanation suffices in a certain number of cases and has been proved correct at the time of operation, when the ureter was found enormously dilated. Cases belonging in this category have been reported by various authors, and in this connection may be mentioned the cases reported by Legueu,[2] Escat,[3] Thomas,[4] Holland,[5] Jeanbrau,[6] Hunter[7] and Fowler.[8]

Owing to the scarcity of cases reported, it appeared to be desirable to collect as many instances as possible from the literature at hand and make brief abstracts. These are given at the end of the paper.

From some of the case reports it appears that the stones were located in dilated ureters and that because of the dilatation the stones were able to wander up

2. Legueu: Bull. et mém. Soc. de chir. de Paris, 1906, **32.** 357-358.
3. Escat: Tr. Assn. franç. d'urol., 1908, **12.** 340-354.
4. Thomas: Ureteral Calculi, Liverpool Med.-Chir. Jour., 1912, **32,** 324.
5. Holland, C. T.: Proc. Roy. Soc. Med., 1900-1910, 3. Electrotherap. Sec., pp. 87-97.
6. Jeanbrau, Emile: Tr. Assn. franç. d'urol., 1909-1910, **13.** 1-175.
7. Hunter, J. W.: Discussion on Lithiasis, abstr., THE JOURNAL A. M. A., Nov. 3, 1917, p. 1496.
8. Fowler: Tr. Am. Assn., G.-U. Surg., 1915, p. 178.

and down the ureter at will. This conclusion is borne out by the fact that the stones were changed in location by changes in the position of the patients, and furthermore by the fact that at the time of operation the ureter was found to be dilated.

2. The second group of cases, namely, those in which no dilatation of the ureter was found at operation, will have to be explained on another basis—that the retrograde movement of the stone was the result of reversed peristalsis of the ureter.

Reversed peristalsis occurs in other hollow viscera, such as the intestine, and it seems reasonable to assume that this phenomenon is also possible in the ureter, although many authors question this.

Evidence tending to substantiate this view has been brought forth both clinically and experimentally. That fluid can travel from the bladder up into the kidney has been demonstrated roentgenographically by various observers in cases in which there was no disease of the genito-urinary tract. In a study of a large number of cystographs made in normal cases, I[9] have shown that solutions of thorium, collargol or cargentos, placed in the bladder, can find their way into the renal pelvis. In cases in which there is disease of the ureteral orifice (tuberculosis) that would interfere with the normal closure, this would of course occur, but these cases do not come under consideration here.

The question may therefore be raised that if it is possible to have fluid propelled up into the pelvis of the kidney from the bladder, is it not possible to have a stone transported upward by reversed peristalsis?

Besides this above-mentioned proof of the possibility of fluid going up into the kidney from the bladder, there can also be brought forth experimental work in

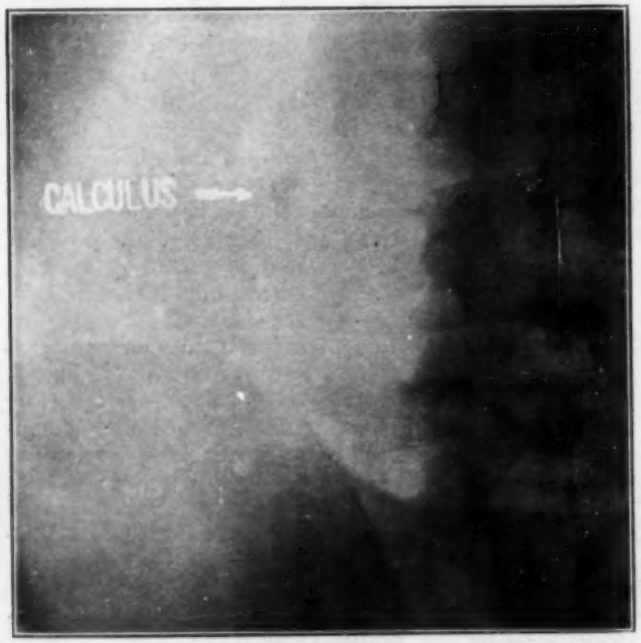

Fig. 6 (Case 1).—Calculus in lumbar portion of ureter, Aug. 8, 1917

which the phenomenon has been demonstrated in laboratory animals. In view of the fact that a regurgitation is possible, it naturally brings up the question of the mechanism by which this regurgitation takes place.

9. Kretschmer, H. L.: Surg., Gynec. and Obst., 1916, **23**, 709.

The following possibilities may be mentioned:

First, that the ureter remains passive; that at the time the ureterovesical valve or sphincter opens to permit the escape of urine, the fluid in the bladder finds its way up the ureter.

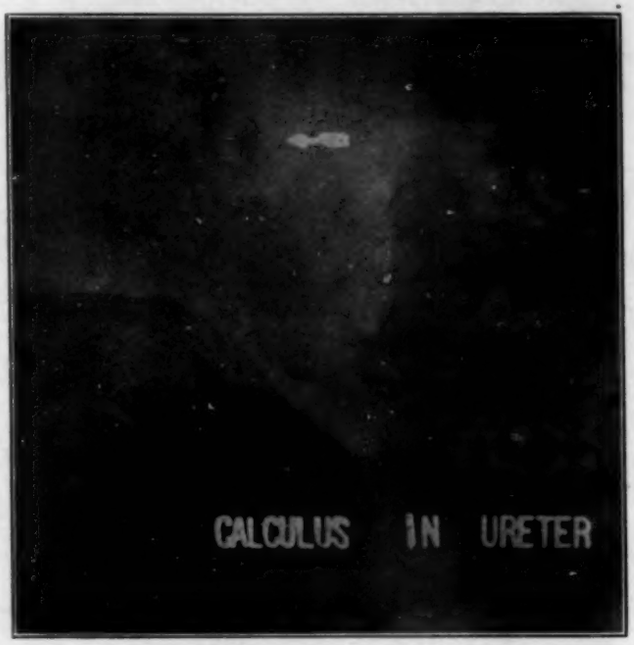

Fig. 7 (Case 1).—Calculus in practically the same position, Feb. 5, 1918.

Second, that the fluid is propagated upward by a reversed peristalsis, and if fluid may be propagated upward by a reversed peristaltic action, why cannot the same reversed peristaltic action be responsible for the retrograde movement of at least some of the ureteral calculi?

Reversed peristalsis of the ureter was demonstrated experimentally by Semblinoff in 1883; he was probably the first to demonstrate a back flow of urine from the bladder to the kidney. He demonstrated the following facts:

1. That a back flow of urine from the bladder into the ureters and kidneys may take place under normal anatomic conditions.

2. That this may be caused by a series of combined movements of the bladder and ureter.

3. That this explains the kidney changes in cases of pyelonephritis of vesical origin.

Semblinoff,[10] by the mechanical irritation of a dog's bladder distended to a certain degree, produced antiperistaltic movements of the ureter, so that Berlin blue solution was driven back through the ureters from the bladder to the kidney pelvis.

In 1893, Lewin and Goldschmidt[11] took up the question of reversed peristalsis and regurgitation of fluid up the ureter. Reviewing their experiments, they found that there was a reflex of bladder contents into the ureter and kidney pelvis. They likewise observed both peristaltic and antiperistaltic movements.

According to Alksne,[12] every part of the ureter is irritable and reacts to mechanical and electrical stim-

10. Semblinoff, quoted by Alksne, J.: Folia urol., 1907, **1**, 338-365.
11. Lewin and Goldschmidt: Virchows Arch. f. path. Anat., 1893, **134**, 33-70.
12. Alksne, J.: Folia urol., 1907, **1**, 338-365.

ulation with contractions. The contractions produced by stimulating any given segment of the ureter are transmitted in both directions, toward the kidney as well as toward the bladder. On irritating the bladder end of the ureter, pronounced antiperistaltic waves are produced.

From the above-mentioned facts it must be conceded that reflux of fluid up the ureter is possible and that reversed peristalsis has been amply demonstrated in the laboratory. In the face of this clinical and laboratory evidence, it would appear logical to assume that the calculi in a certain percentage of cases change their positions because of the presence of a dilated ureter, and that in a certain number of them the retrograde movement of the stone is due to reversed peristalsis.

CASES REPORTED IN THE LITERATURE

LEGUEU[2].—In a patient, aged 30, who had recurrent attacks of kidney colic, a roentgenogram disclosed two calculi in the left kidney that were movable and could be displaced. In a series of ten roentgenograms the calculi were never found in the same location; sometimes they were in the kidney and sometimes in various places along the ureter. At operation the kidney was dilated and the pelvis and ureter more so.

ESCAT[3].—A man, aged 36, had attacks of pain, vomiting and difficult urination. Cystoscopy revealed a calculus protruding from the ureteral orifice. A roentgenogram revealed a calculus in the prevesical ureter. Suprapubic cystotomy was performed, and the stone, which could be seen with the cystoscope, could not be seen. It was felt 8 cm. from the ureteral meatus. The ureteral orific was slit, and the patient subsequently passed the stone.

THOMSON-WALKER[13].—In a patient on whom operation was performed, a round calculus the size of a marble traveled from the lower part of the pelvic ureter into the lumbar

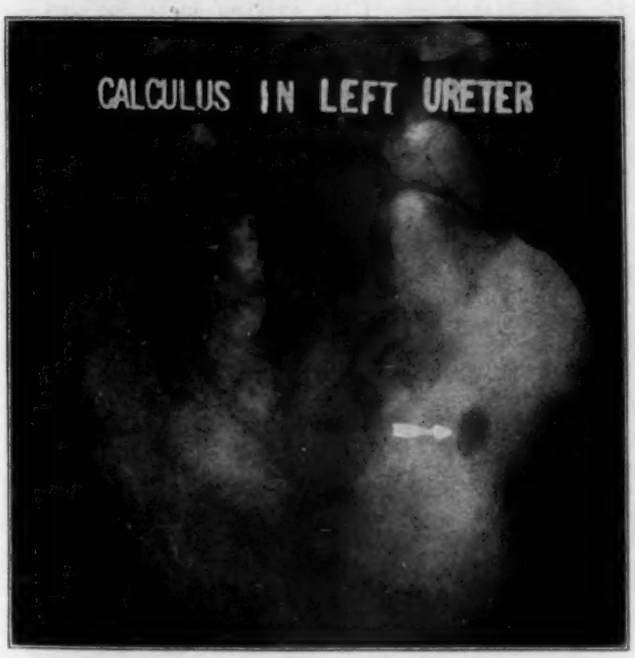

Fig. 8 (Case 2).—Calculus in pelvic portion of ureter, Aug. 14, 1917, about seven weeks before operation.

ureter, when the patient was placed in the Trendelenburg position.

THOMAS[4].—A man, aged 23, gave a history of stoppage of urine and hematuria. Four sets of roentgenograms were taken on four different days with these findings: November 13, one stone in kidney, two in pelvic ureter and two (?) in bladder; November 22, one in kidney, one in pelvic ureter and three (?) in bladder; November 25, one in kidney, one in pelvic ureter and three in bladder; November 27, four in pelvic ureter and one in bladder. At operation one stone was found in the bladder, and four were removed from the dilated

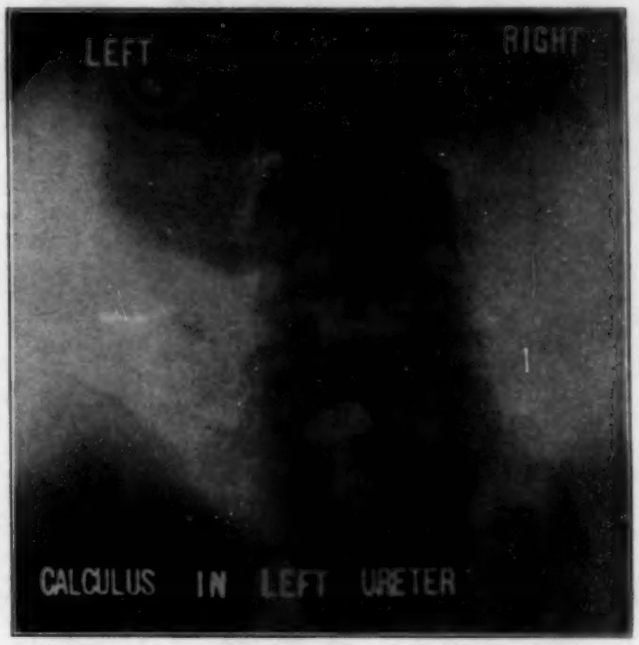

Fig. 9 (Case 2).—Calculus in lumbar ureter, Oct. 5, 1917, just before patient was anesthetized.

portion of the ureter. Thomas concludes that the dilatation of the ureter permitted the stones to move up and down according to the position of the patient.

CODMAN[14].—The ureter was greatly dilated, associated with an intravesical cyst of the ureter. Codman believes that the high position of the stones found at operation was due to the Trendelenburg position of the patient.

HUNTER[7].—A woman was operated on twice for stone in the lower ureter and no stone was found, although at the operation the ureter was found dilated and inflamed. Later the stone was found in the pelvis of the kidney. When the patient was up the stone would descend to the lower end of the ureter, but when she remained in bed it worked back up into the kidney.

FOWLER[8].—In a case of stone in the ureter Fowler had the unpleasant experience of operating and failing to find the stone. He finally succeeded in removing it from the kidney.

HOLLAND[6].—A woman, aged 45, had had attacks of pain in the right loin with backache and hematuria for six years. Roentgenoscopy revealed a small calculus in the right kidney and also a very large shadow in the pelvis, more than an inch long. The small kidney stone was removed and the ureter probed, but no other stone was found. On roentgenoscopy the next day, the large pelvic shadow had disappeared. Two and a half months later the patient returned with the same complaint, and a roentgenogram revealed the same shadow in the right kidney. Another roentgenogram, made a few days later, just before the patient was to be operated on, revealed no shadow in the kidney pelvis, but a stone was seen in the lower end of the ureter. The ureter was opened and the stone removed. The ureter was dilated and this large stone could apparently move at will up and down its whole length.

122 South Michigan Avenue.

13. Thomson-Walker: Surgical Diseases and Injuries of the Genito-Urinary Organs, London, 1914.

14. Codman, E. A.: Boston Med. and Surg. Jour., 1908, **158**, 828-831.

A Long Life.—"He lives longest," says an ancient proverb, "that is awake the most hours."

ISOLATED DISEASE OF THE SCAPHOID*

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A pathologic condition limited to the scaphoid bone of the foot is rarely observed. First described by Köhler in 1908, it has since been known as "isolated disease of the scaphoid," or "Köhler's disease." Including the three cases described by Köhler, thirteen cases of this condition have been reported in the literature. Having had the opportunity of observing such a case recently, I have found it worth while to report it, incidentally directing attention to certain distinguishing features concerning its pathologic history.

REPORT OF CASE

A boy, aged 7 years, was brought to see me, Nov. 6, 1917. Lameness was the chief complaint. The family history was negative as to tuberculosis and syphilis. Both parents are living and well. The home surroundings, the rural environment of a prosperous farmer, had been ideal. The child had never had any illnesses, except measles and infected ears the preceding two winters, his health having been apparently perfect.

About two weeks before he came to see me, it had been noticed that he was limping and lame in his right foot. There had been no previous injury, except about six weeks before the onset of his symptoms, when a board had fallen across the dorsum of his foot. The lameness had persisted. Pain had seldom been complained of, and never when he was off his feet. There had been no night cries. A slight swelling had been noticed over the inner side of the dorsum of his foot.

Fig. 1.—Roentgenogram of both feet taken at first examination, the right or diseased foot being shown at the left.

The physical examination revealed a well nourished, healthy looking boy. The general examination was negative. He walked with distinct lameness of the right foot. The ankle joint function was normal. Locally, there was a slight swelling over the inner side of the dorsum, also a slight tenderness, but no discoloration. When he stood and bore weight, there was marked pronation and bulging of the inner side of the foot.

The boy presented very notched teeth, but the Wassermann reaction was negative, likewise the von Pirquet reaction.

Roentgen-ray examination disclosed a typical appearance of the scaphoid. Lantern slides will demonstrate them better than I can describe them. Briefly, the shadow of the scaphoid

Fig. 2.—Right foot at first examination.

was smaller than normal and irregular in outline, and the cortex and spongy portion showing no distinction (Figs. 1 and 2).

The diagnosis was Köhler's disease of the scaphoid. Treatment consisted of immobilization in plaster-of-Paris and crutches.

Two months later, the boy was brought to see me again and the plaster was removed. All swelling and tenderness had disappeared and he was in his usual good physical condition. Another roentgenogram showed much improvement, as seen in the increased size and filling out of the irregular bone (Fig. 3). The density was also better. Another plaster dressing was applied and the patient was sent home.

Three months later, or five months after the first examination, he again returned to Portland. The plaster was removed and the foot looked normal in every way. Another roentgenogram disclosed an almost perfect scaphoid, and he was considered practically cured (Fig. 4). Living several hundred miles away, he was sent home with another plaster dressing to be worn for a month, with instructions to follow it with adhesive plaster strapping and to wear a supportive shoe while gradually resuming use of the foot. Late reports are that the boy seems perfectly well.

ETIOLOGY

There is nothing new to be offered as explanatory of the etiology or nature of the affection. Numerous theories as to its etiology have been advanced, but the situation is still doubtful. With Pfahler,[1] all authors agree that it is not tuberculous. Fassett[2] inclines to the theory that it is a mild tuberculous focus, the wall of cicatrization having been broken down by some trauma. My own case does not impress me as tuberculous, as the amount of bone involvement pres-

* Read before the Section on Orthopedic Surgery at the Sixty-Ninth Annual Session of the American Medical Association, Chicago, June, 1918.

1. Pfahler, G. E.: Surg, Gyn. and Obst., 1913, **17**, 625.
2. Fassett, F. J.: Isolated Disease of the Scaphoid, The Journal A. M. A., April 11, 1914, p. 1155.

ent within two weeks of the onset of symptoms and its rapid disappearance under treatment do not harmonize with the history of known tuberculous bone disease. The recovery has been too prompt and too complete to be consistent with tuberculosis.

That syphilis was not a factor in my case, in spite of the negative history and Wassermann reaction, is shown by the fact that recovery took place without any antispecific treatment.

Trauma has been considered a factor. While my case gives a history of a board falling across the foot six weeks before the onset of any symptoms, the circumstance seems almost too inconsequential to be a factor of much importance. Still Pfahler considers the condition as an osteitis, probably of traumatic or rheumatic origin, which interferes with the development of the bone. That it is inflammatory, almost all authors agree, but as to the nature of the inflammation, we are still at sea. Hetzel,[3] in his valuable paper of a year ago, notes the similarity of the condition and osteochondritis juvenalis of the hip, both occurring in the epiphysis at the height of ossification.

Delayed ossification has been suggested, but if one compares the roentgenograms of both feet (Fig. 1) in my case, it would be hard to explain why one foot lagged so far behind the other, except on account of trauma, which in my case would seem hardly sufficient.

The diagnosis is the important feature; for when once recognized, the prognosis is absolutely good, both as to function and cure, under rest and support in a comparatively brief period of time. Before this section, it is unnecessary to emphasize the importance of routine roentgen-ray examinations. But their importance should be more generally recognized. How often children are presented to us with weak feet or flatfoot! As they are at times associated with moderate swelling

Fig. 3.—Right foot two months later.

and tenderness, pronation on standing, and limping, especially if unilateral, we should be on our guard and make the roentgenogram a part of our examination. At times we all see tuberculous ankles that have been treated as flatfoot. Likewise these affections, similar to the one under discussion, should not be considered as a broken arch or flatfoot and so treated. The discovery of one such case all the more thoroughly justifies routine roentgen-ray examination in all foot cases of doubtful history.

3. Hetzel, W. B.: Am. Jour. of Orthop. Surg., 1917, **15**, 214.

ABSTRACT OF DISCUSSION

DR. WILLIS C. CAMPBELL, Memphis, Tenn.: I have had two cases of this condition within the past year, and two others

Fig. 4.—Right foot five months after first examination.

in previous years. Trauma did not seem to be the cause in any of the cases I have seen. In one of my cases the Wassermann was 2 +, and it was interesting that the grandmother of this child was under my care for syphilitic periostitis, with a 3 + Wassermann. The grandmother responded to treatment. The child has been on antisyphilitic treatment, and I am doubtful whether the improvement in the condition has anything to do with the treatment. The roentgen-ray findings are quite characteristic, as Dr. McClure described. For instance, in the scaphoid the edge is somewhat irregular in appearance, and on the side view it looks like a flattened coin. I have not used plaster or any other form of fixation in these cases. I have used a simple steel arch support, which has been quite sufficient.

DR. S. C. BALDWIN, Salt Lake City: I should like to know what treatment the doctor used, if any, besides the plaster cast.

DR. CHARLES R. MCCLURE, Portland, Ore.: The treatment consisted exclusively of immobilization in plaster of Paris and keeping the weight off the foot.

Cooperation in Treatment.—The late S. Weir Mitchell was a marvel of proficiency in curing patients. Those associated with him professionally usually endeavored to appropriate and apply his methods. To those of his assistants like myself, having experience with other neurological clinicians, illuminating contrasts are afforded. In my opinion the chief instrumentality of his amazing successes was his prompt and cordial cooperation with experts in correlated lines, himself not attempting to do it all. The distinguishing characteristic of Dr. Mitchell was his radiant energy and his clear-sighted recognition of the value of joint action. He so stimulated the zeal of his adjutants as to get the best out of them not only in diagnosis but in treatment. Thus an efficient coalition was constantly at work. He uniformly said and did the judicious thing to create and maintain team work. In leadership he was wisdom personified in plan, in strategy, in shifting the point of approach, in creating useful surprises, in persistent effort, thus achieving the most economic and permanent results.—J. M. Taylor, *Pennsylvania Medical Journal*, September, 1918.

FRACTURE OF THE SPINAL COLUMN WITH AND WITHOUT CORD INJURY

NORMAN SHARPE, M.D.
NEW YORK

When the subject of fracture of the spinal column is under consideration, we think of it in terms of cord symptoms—impairment of motility and sensation, or paralysis with disturbance of sphincteric control. This is natural, for in by far the greater number of fractures of the spine, the cord or its roots are involved, and the bony fracture itself is a minor hurt compared to the possible result if the cord also is injured.

There are, however, a large number of spinal fractures (Pearce Bailey estimates this to be one third of all cases) in which the cord and its roots escape damage. Unless careful examination is made, these cases are apt to be diagnosed as sprain or contusion. In a recent article I[1] reported such a case, a fracture dislocation of the second cervical vertebra without damage to the cord. Since then I have seen five other cases, in some of which the bone injuries were such that it is difficult to understand how the cord escaped involvement.

In four of these cases the fracture occurred in the vertebral bodies, in two of them the bodies being almost completely crushed. Yet these patients were able to stand and move after the accident. As we know that many of the posterior arches or laminae can be removed without materially weakening the spine, and, as we have just seen, crushing of a vertebral body does not render one unable to stand erect,

Fig. 1 (Case 1).—Fracture of the body of the eleventh dorsal vertebra.

it is apparent that the main support or strength of the spinal column lies in the articulations on the transverse processes. And it is rare in fracture by indirect force to have the cord injured (except by hemorrhage) unless there is rupture of these articulations. The converse is also true, that the most severe injuries of the cord are seen when these articulations are ruptured, the familiar unilateral or bilateral fracture-dislocation of one or more vertebrae.

Fig. 2 (Case 2).—Fracture-dislocation of the sixth cervical vertebra.

In fracture-dislocation, the displaced vertebra may remain displaced, or spring back partially or completely into its normal position, leaving as the only signs of its dislocation the signs of cord injury. These signs may vary from partial paralysis to complete abolition of all function below the lesion, giving rise to the suspicion that the cord has been completely crushed at the point of injury. But, as was pointed out in a former article,[1] complete abolition of function below the lesion in a spinal fracture does not prove that the cord is completely crushed or severed, or even that it is damaged beyond repair. This has been shown time and again at operation, and also in the after-results in unoperated cases.

In a case recently seen by me, one and a half years after the accident, there had been a fracture of the fifth and sixth cervical vertebrae, with complete loss of function below the lesion. On the ground that this showed complete destruction of the cord, operation was withheld. Three months after the accident there was slight return of power in the right leg and partial return of sensation over the body below the lesion. At this time operation was again withheld, on the ground that the improvement was too slight to make it worth while to operate, and, on the other hand, that as the condition was improving it would be better to wait and see how much it would improve. Eighteen months after the accident the patient reported that improvement had ceased at the end of one year. He could weakly raise the arms, but could not bring them down, and could weakly extend and flex the right foot and leg. There was hypesthesia to all forms of sensation below the lesion, with complete loss of sphincteric control. He could not stand or even sit. Laminectomy was done and the laminae and pedicles of the fifth and sixth cervical vertebrae were found fractured and jammed about the cord, severely compressing it. The dura had not been torn, and the cord, though pale, was of normal appearance otherwise. Following operation there has been gradual return of power, so that now, six months after operation, there is fair strength in the arms, especially in the

1. Sharpe, Norman: Am. Jour. Med. Sc., 1916, **152**, 865.

right, and the patient is able to walk with crutches. Hypesthesia has been replaced by areas of hyperesthesia and paresthesia. He is still improving.

Though helped by late operation, how much more benefit would this patient have received by an early laminectomy. The only reliable sign that proves a complete crush of the cord, and the only contraindication to early operation, is a bony deformity so great as to show complete obliteration of the spinal canal. By the term "early operation" is meant a laminectomy after the patient has rallied from the initial shock of the injury. Naturally if the injury has been so severe, or if the patient's vitality is such, that he cannot rally from the condition of shock, any operation at this time will hasten death. A safe general rule to follow is not to operate while the pulse is above 110.

In many fractures of the spinal column without cord signs, the fracture has been entirely overlooked. In the case of a woman previously reported who fell on a stairway striking the back on a step, there were no signs of nerve involvement, and a fracture was not suspected. Months after the accident and when all pain had long since disappeared, cord symptoms appeared and gradually increased. Only when they became marked was attention directed to the old accident, and roentgenoscopy disclosed marked callus formation at the site of the injury, the twelfth dorsal and first lumbar vertebrae.

In the absence of cord symptoms and no marked protrusion or "knuckle" of the spine, the diagnosis is apt to be "simple sprain or contusion." Thus in Case 3, in which there was a marked crushing of the body of the twelfth dorsal vertebra, at the hospital to which the patient was first taken he was told that the injury was simply a contusion, and no roentgenogram was taken.

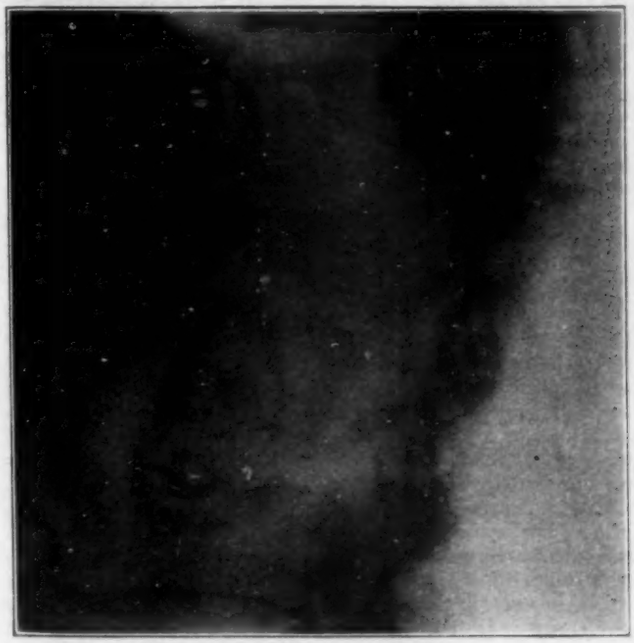

Fig. 3 (Case 3).—Crushing of the first lumbar vertebral body.

If other injuries are present, the spinal fracture without cord involvement is apt to be overlooked. In Case 4, in which severe burns of the arms and shoulders were sustained in addition to the injury of the back, the burns were treated as the principal lesion, and in the absence of cord symptoms no attention was given to the spine, though the patient complained of pain in the lumbar region. Three weeks later, when the burns were nearly healed, the persistence of the pains directed attention to the spine, and examination revealed alteration in the normal spinal curve in the

Fig. 4 (Case 4.—Crushing of the twelfth dorsal vertebral body.

dorsal lumbar region. Roentgenoscopy disclosed a marked crushing of the body of the twelfth dorsal vertebra.

These cases indicate the necessity of careful examination, both clinical and by the roentgen ray, of all cases of suspected injury to the spine. Although in neither of these cases did the failure to recognize a spinal fracture result seriously, it is readily conceivable that in a patient able to move about in bed with the fracture not immobilized, sudden twisting or turning movements by the patient or his attendants might easily convert a fracture without cord signs into a fracture with marked and serious cord involvement. Also failure to recognize a fracture and no attempt made to restore the normal spinal curve may result in weakening of the spinal column and more or less permanent disability, with perhaps appearance later of cord symptoms, due to new bone formation. This is especially true when the fracture occurs in the vertebral bodies.

The treatment of fractures of the spinal column without cord symptoms is immobilization. In fractures of the cervical vertebrae, immobilization is best secured by a plaster collar. If the fracture is high in the cervical region, an extension should be made from the collar about the forehead. If the fracture lies in the lower cervical region, an extension should also include the upper chunk. After from six to ten weeks, when all pain and tenderness have disappeared, the plaster may be followed by a stiff leather collar, which gives support but is more comfortable and allows greater freedom of movement. If the fracture lies in the laminae of the dorsal or lumbar vertebrae, a molded splint of plaster on each side of the spinal column and connected by transverse bands above and below the lesion will be found a satisfactory way of immobilizing the fracture and preserving the normal

outline of the spinous processes. Fracture of the vertebral body is best treated by overextension on a Bradford frame, which is much more comfortable and efficacious than a plaster jacket.

REPORT OF CASES

The following cases, some of which were seen with Dr. William Sharpe, are examples of extensive fractures of the spine following severe injuries, without cord signs:

Case 1.—A. M., man, aged 22, while employed as a bell boy in September, 1915, fell through the dome of a skylight, a distance of 18 feet, striking the floor on his head and shoulders. Unconscious and severely contused, he was taken to a hospital where a diagnosis was made of fractured skull; this was changed a few days later to cerebral contusion. The patient was unconscious for three days, and stuporous and dazed for two weeks. There were no signs of cord involvement present at any time. No operation was done, and he was discharged from the hospital "improved," but complainng of headache and pain in his back. When seen, two months later, his cerebral condition had almost entirely cleared up except for occasional dull headache. His chief complaint was pain and weakness in the back aggravated by standing or walking. This pain was severe enough to prevent his returning to work. Examination disclosed a projection backward of the spinous process of the eleventh dorsal vertebra and alteration of the normal spinal curve in this region. Roentgenoscopy revealed moderate crushing of the body of the eleventh dorsal vertebra and slight dislocation backward of this vertebra; the upper borders of the twelfth dorsal vertebral body were "lipped," and there was evidence of slight crushing of this vertebra also. The neurologic examination was negative. The tendon and skin reflexes were present and normal; there was no Babinski reflex, no ankle clonus, no sensory changes and no disturbance of the sphincters. A metal brace was applied, causing slight overextension of the spine at this point. When seen two years later, the patient was found to be normal except for some spinal rigidity at the dorsal lumbar junction and slight alteration of the normal spinal curve. From habit he was still wearing the brace, which he was advised to discard.

Fig. 5 (Case 5).—Fracture-dislocation of the fifth cervical vertebra.

Case 2.—R. H., a man, aged 20, while playing polo in October, 1915, was thrown from his horse, striking on his neck and shoulders. He was not unconscious, but complained of severe pain in the neck radiating to the back of the head. He was able to walk off the field. He remained in bed two days with severe pain in the neck. There was no radiation of pain in the arms and legs and no sphincteric disturbance. Two weeks later the lower tendon reflexes were found to be somewhat increased; there was no Babinski reflex; the abdominal reflexes were present and equal; there was no impairment of motility or of sensation in either the upper or the lower extremities. Roentgenoscopy (by Dr. Caldwell) revealed a fracture-dislocation of the sixth cervical vertebra with backward displacement of one-half inch. Naturally, in view of the fact that there were no signs of cord injury found, no operation was done, but the head and neck were placed in a plaster collar. The patient made an excellent recovery, so much so that in the following year he rowed on a 'varsity crew. There have been no complaints up to the present time.

Case 3.—S. B., a man, aged 30, in April, 1917, fell 40 feet from a window, first striking his back on a wooden railing 10 feet below the window, and then continuing to fall 30 feet, landing on a wooden floor on his left side. When he struck the railing he had severe pain, and says he "thought his back was broken." He was not unconscious and had no pain nor numbness in the legs. When lifted he was able to stand alone; he was taken to a hospital, where he was told that the injury to the back was a contusion. No roentgenogram was made. He had severe pain in the lumbar region and the left flank. There was no sphincter trouble, and he passed no blood. He was out of bed on the eleventh day, and left the hospital in two weeks. He was at home a week, in and out of bed, with severe pain in the back and some pain on the inner side of the left thigh. During this week he tried various "stunts to loosen up his back," getting down on the floor on his hands and knees and twisting about, kicking out with the feet, etc. This caused pain. Three weeks after the accident, examination revealed an alteration in the normal spinal curve at the dorsolumbar junction, a kyphosis, and protrusion of the spinous process of the first lumbar vertebra. Roentgenoscopy revealed marked crushing of the body of the first lumbar vertebra. There were no motor or sensory changes, and the reflexes were unaltered. There was some tenderness to pressure over the spine and marked tenderness in the left flank. The tenderness on the inner side of the left thigh disappeared the following week. The patient was placed on a Bradford frame with overextension of the spinal column for four weeks. When he left the hospital he was fitted with a steel brace, which he wore during the day for eight months. Examination nine months after the injury showed the spine strong and supple, with slight projection of the spinous process of the first lumbar vertebra. There were no root pains and no signs of motor or sensory involvement of the cord or roots.

Case 4.—C. P., a woman, aged 18, was trapped by fire on the fifth floor, in March, 1917. After clinging to the window-sill and being burned extensively on the arms and back, she fell and struck the middle of the back across an iron bar at the first story, and then fell to the ground. She was dazed but not unconscious, and after being lifted up could stand erect and move about. She was brought to the hospital in an ambulance. She complained of pain in the back at this time more than of the burns. There was no pain nor any numbness in the legs. The burns were treated and no attention was paid to the back. Thirty hours after the injury the temperature rose to 105 F. and fell shortly to 102; on the seventh day it was normal and continued so. The patient moved about in bed, but there was no weakness in the legs, though these movements caused pain. Three weeks later, because of the persistence of the pain, examination of the back was made and a protrusion found in the dorsolumbar region. Roentgenoscopy revealed marked crushing of the twelfth dorsal vertebra. Careful neurologic examination at this time showed no impairment of motility or sensation. The patient was placed on a Bradford frame in hyperextension, and the pain ceased in a day or two. After five weeks the patient was fitted with a rigid brace for the spine, which she wore for several months. Examination one year later showed her to be normal and able to work, and with no complaint.

Case 5.—H. B., a man, aged 47 years, while working as a ship rigger, in March, 1918, fell 35 feet and was unconscious

for fifteen minutes. The right side of the head and face was badly cut and three ribs were broken, but his chief complaint was pain in the back of the neck. He was unable to turn his head in any direction on account of the pain in the neck. He was taken to a hospital, where he was told that his neck was sprained. He was twelve days in bed, being treated for the fractured ribs and other injuries, though his chief complaint was pain in the neck. No roentgenogram was taken at this time. Three weeks later, twenty-two days after the injury, the pain persisting, a roentgenogram was taken, which showed a dislocation backward of the fifth cervical vertebra with fracture of the body of the fourth cervical. Neurologic examination at this time was entirely negative. There was no impairment of motility or sensation and no alteration of the deep or superficial reflexes. The patient carried his head in a peculiar stiff manner, though he could move it without much discomfort. A plaster collar was applied and he is still under observation.

315 West Ninety-Seventh Street.

CANCER OF THE ORAL CAVITY, JAWS AND THROAT

TREATMENT BY ELECTROTHERMIC METHODS OR IN COMBINATION WITH SURGERY, THE ROENTGEN RAY AND RADIUM, WITH AN ANALYSIS OF TWO HUNDRED CASES SO TREATED *

WILLIAM L. CLARK, M.D.

PHILADELPHIA

Electrothermic methods are peculiarly adapted to the treatment of cancer within the mouth. Malignant tissue (including bone) occurring in any part of the oral cavity, comprising the lips, buccal surface, tongue, floor of the mouth, alveolus, hard palate, antrum, tonsils, pharynx, epiglottis, larynx and proximal end of the esophagus, may be destroyed with one electrothermic operation.

It is not necessary to split the cheek surgically to render a growth accessible to treatment, since the exposure secured by the use of a mouth gag, cheek retractors, traction on tongue by means of a suture or tongue forceps, or by the use of an endoscope is

Fig. 1.—*A*, basal cell epithelioma of the upper lip in a woman, aged 72, referred by Dr. William Hamilton of Philadelphia. One desiccation treatment was given in September, 1914. *B*, result. Note absence of contracted scar. No recurrence in nearly four years.

sufficient to permit the destruction of a growth. A tongue may be coagulated to the base and then excised without hemorrhage.

In addition to the desiccation or coagulation of tissues and the sealing of blood and lymph channels, the heat penetrates beyond the area totally destroyed and devitalizes malignant cells without impairing the healthy tissue, thus lessening the likelihood of local recurrence or metastasis and conserving the maximal amount of normal tissue.

Blood vessels encountered in the oral cavity are blocked by the current, and secondary hemorrhage rarely occurs. The efficiency of electrothermic methods is increased in some cases by the judicious use of operative surgery, the roentgen ray and radium.

Fig. 2.—*A*, epithelioma of lower lip, a recurrence after surgical excision, in a man, aged 75, referred by Dr. Paul Cassidy of Philadelphia. One desiccation treatment under local anesthesia was given in April, 1915. *B*, result of treatment. Note absence of contracted scar and regeneration of lost tissue in lip. No recurrence in more than three years.

ELECTROTHERMIC METHODS

The methods to be considered are electrodesiccation and electrocoagulation. The desiccation method is one by means of which malignant growths of small or moderate size may be destroyed by the utilization of heat of just sufficient intensity to desiccate or dehydrate the tissues, and is produced by a monopolar high frequency current of the Oudin type, which is applied to the lesion by means of a steel needle or other pointed metallic applicator (usually steel knitting needles) which may be cut and curved, if necessary, to suit the case under treatment. The desiccation method is of advantage when the lesion is localized and a good cosmetic result is to be desired, and is subject to such control as to area and depth that a very small growth even on the cornea may be successfully treated without injury to vision, as may a growth on the vocal cords be destroyed without impairing phonation. The very slight trauma and absence of secondary inflammation probably explains the absence of scarring and the success obtained in treating delicate structures.

Electrocoagulation is produced by a bipolar high frequency current of the d'Arsonval type, is more penetrating and intense in action than the desiccation method, and is utilized to destroy large growths, including those that involve bone.

There are many variations of technic in the application of both methods to suit the requirements of the individual case, which need not be considered in detail here.[1] The heat from high frequency currents, unlike that from the thermocautery and galvanocautery, is not transmitted by contact, but is generated within the tissues by the resistance offered to the current. The

* Read before the Section on Stomatology at the Sixty-Ninth Annual Session of the American Medical Association, Chicago, June, 1918.

1. Pfahler, G. E.: Electrothermic Coagulation and Roentgenotherapy in the Treatment of Malignant Disease, Surg., Gynec. and Obst., December, 1914. Clark, W. L.: Electrical Desiccation as an Adjunct to Surgery, with Special Reference to the Treatment of Cancer, ibid., August, 1912; The Desiccation Treatment of Congenital and New Growths of the Skin and Mucous Membranes, THE JOURNAL A. M. A., Sept. 12, 1914, p. 925; Electrothermic Methods in the Treatment of Rodent Ulcer, Urol. and Cutan. Rev., November, 1917.

cautery is comparatively superficial in action, while the high frequency current under proper conditions will penetrate and destroy tissue to any depth, in parallel or divergent lines, depending on the size and arrangement of the electrodes, and also the strength and quality of current, which are varied to suit indications.

Fig. 3.—*A*, epithelioma involving upper lip, antrum, septum, nose, alveolus and hard palate, of three years' duration, in a man, aged 66, referred by Dr. J. D. Graber of Royersford, Pa. Previous treatment by plasters and the roentgen ray had been unsuccessful. The case was pronounced hopeless from a surgical standpoint by Dr. John Chalmers DaCosta of Philadelphia. One electrothermic coagulation treatment under ether anesthesia was given, March 1, 1916, and two slight recurrences were treated under local anesthesia by the desiccation method. *B*, final result, with no recurrence in two years and five months. *C*, reconstructed features by the sculpture method executed by Major R. Tait McKenzie of Philadelphia and Mrs. Alan Chesney of Baltimore. A plaster cast was made and the lost features built out in clay. A copper plate of suitable thickness was deposited on the cast by electrolysis and then silver plated. This plate was painted to match the tint of the skin, the mustache added and the plate attached to the rims of the glasses. A similar plate may be kept in place by means of spirit gum without the aid of the glass frames if desired. A plate is under construction to replace the hard palate and with artificial upper and lower teeth, in the hope that the patient may improve articulation and better masticate his food.

OPERATIVE SURGERY, THE ROENTGEN RAY AND RADIUM

When the antrum or other structures not easily accessible are involved, or when normal tissues cover the growths, operative surgery should be practiced as a preliminary to expose the lesion or to extirpate the gross mass of malignant tissue, followed immediately by the electrothermic treatment to check hemorrhage and to reach malignant tissue not possible to reach by the scalpel or bone-cutting instruments.

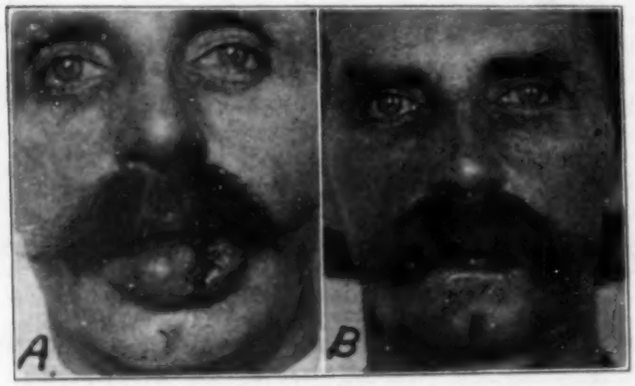

Fig. 4.—*A*, epithelioma involving the whole of the lower lip, in a man, aged 48, referred by Drs. G. C. Bird and J. F. Ulman of Philadelphia. One desiccation operation to the lip was performed under local anesthesia. *B*, result of desiccation treatment. Note absence of contracted cicatrix and regeneration of lost tissue. No recurrence in lip in four months.

When involved cervical glands are to be removed, excision must be practiced because it would be dangerous to work with the current near vital structures in the neck.

Before large growths at the base of the tongue, epiglottis, larynx or esophagus are treated, a tracheotomy should be done first and the larynx packed from below to prevent aspiration of toxic or other secretions. The ligation of the external carotid, and in rare instances the common carotid, may be practiced as preliminary to the treatment of some growths of the throat. Hemiplegia may occur, however, in the latter instance.

Deep, cross-fire roentgen therapy, according to standard technic, should be applied to the neck after dissection of the cervical glands, with the hope of preventing recurrence. When the glands are not involved, the roentgen ray should also be applied to them after electrothermic treatment of the primary lesion. The roentgen ray is of more value in the latter instance than in the former, as its use often prevents involvement of the glands, and when they are involved the roentgen ray will often retard the progress of the disease. Deep, cross-fire roentgen therapy may be used following electrothermic destruction at the site of the primary lesion to reach possible outlying cancer cells, as may radium, especially within the mouth; but the same area should never be treated by both the roentgen ray and radium. I have never seen any benefit result, however, from the use of the roentgen ray or radium alone in the treatment of cancer within the oral cavity, but the roentgen ray is of undoubted value as an adjunct to electrothermic methods and surgery.

CLINICAL OBSERVATIONS

Cancer of the mouth occurs more frequently in men than in women. The great majority of persons suffering from malignant lesions within the mouth have all their lives been insanitary or careless in the care of their mouth and teeth. Indifferent dental work or rough teeth causing continued irritation has been found to be a predisposing cause in many cases of mouth cancer, for the disease begins exactly at the site of the area which has been subject to a continued irritation.

Permanent bridge work and poorly fitting plates permitting the retention of food, and irritation to the gums are also factors in the development of malignant disease in the mouth. The removable bridge is best, and great care should be taken by dentists in properly fitting and adjusting plates.

Leukoplakia, papillomas, angiomas, chronic stomatitis, root abscesses and fistulas should be appropriately treated as a prophylactic measure against the development of malignant disease.

The irritation caused by excessive smoking is a contributory factor to the development of leukoplakia and mouth cancer, especially in those who fail to keep their mouth and teeth clean.

A striking number of mouth cancer patients are also syphilitic, and a combined tertiary lesion and cancer is not uncommon. This is true also of tuberculous lesions.

All papillomas or ulcers in the mouth showing a tendency to progress, unless the lesion is positively and purely syphilitic, should be treated just as though they were cancer, regardless of the pathologic finding, as all papillomas are potentially malignant.

A section should never be taken for pathologic examination except immediately before operation, if this seems necessary. A frozen section can be made and a diagnosis returned in ten minutes. By excising a piece of tissue for examination and waiting one or two weeks for a report, one will probably find that metastasis or rapid extension of the disease has taken place, owing to the opening of blood and lymph channels.

Before treatment is begun in any case of mouth cancer, a careful stereoscopic roentgenographic study should be made to detect possible bone or antrum involvement. Transillumination tests also should be made as a confirmatory diagnostic measure.

Fig. 5.—*A*, epithelioma involving nose, cheek, brow, eyelid, globe, and bones of orbit and antrum in a woman, aged 59, referred by Dr. T. L. Bradford of Philadelphia. Roentgen treatment had previously been used unsuccessfully. One intensive electrothermic coagulation treatment under ether anesthesia was given in March, 1917. *B*, result of one treatment. No recurrence in year and a half.

Success in the treatment of cancer is obtained only by absolute eradication of the last vestige of disease, else it will surely recur, and will progress more rapidly than if left alone.

Malignant lesions occurring in the mucous membranes are usually of the squamous cell type. They progress rapidly and metastasize early, in contradistinction to the basal cell or rodent ulcer type occurring on cutaneous surfaces, which progress slowly and seldom metastasize. If the mouth cases are localized and treated by electrothermic destruction and the cervical glands treated by the roentgen ray, a fair percentage of cases will be clinically cured.

The prognosis of cancer of the mouth with cervical glandular metastasis is always bad, no matter how early seen, yet a small percentage of patients recover after appropriate treatment, and it is worth while to attempt treatment when the glands are movable and not adherent. When the glands are adherent and other structures in the neck are involved, it is not worth while attempting treatment except for palliation. In early diagnosis and treatment lies the only hope.

Lip cases and small lesions within the mouth may be treated under local anesthesia; but if the lesion is advanced, general anesthesia should be employed to insure thorough destruction.

Fig. 6.—*A*, basal cell epithelioma, involving tissue and bone at angle of jaw, in a man, aged 73, referred by Dr. John Hedges of Philadelphia. The roentgen ray had previously been used without success. One desiccation treatment under local anesthesia was given in March, 1917. *B*, result of one treatment. Note absence of contracted scar. No recurrence in one year and a half.

ANALYSIS OF TWO HUNDRED CASES OF CANCER OF THE ORAL CAVITY, JAWS AND THROAT

Two hundred cases were treated by one or both of the electrothermic methods or in combination with surgery, the roentgen ray and radium. Surgery was used when the lesions were inaccessible to the current, when it required the incision of healthy tissue to expose the growth, or when it was necessary to excise the glands. In the majority of these cases the roentgen ray, radium or both had been used before without success, in which case these agents were not used again. When the roentgen ray or radium had not been employed before, one or both measures were used in combination with electrothermic methods, when judgment indicated the wisdom of so doing.

Two types of cases were selected for the series. First, those that were distinctly localized in which a guardedly favorable prognosis could be given, and second, those which had metastasized to the cervical glands, but the glands were movable and not adherent to the tissue of the neck, in which the prognosis was

Fig. 7.—*A*, rodent ulcer involving bone of maxilla and mandible, of three years' duration, in a man, aged 50, referred by Dr. William H. Schmidt of Philadelphia. One electrothermic coagulation treatment was given under ether anesthesia in April, 1915. *B*, result. No local recurrence in eight months, when patient died with what was diagnosed as abscess of the brain by the attending physician, but which may have been metastasis.

unfavorable, but judgment indicated there was a chance of success if treated by combined measures.

Numerous other very advanced cases, in which the primary lesion was very extensive, with adherent metastatic glands, and involvement of other structures in the neck, were either declined as absolutely hopeless or else treated palliatively with no thought of cure, but sometimes to destroy a growth on the tongue or in the throat to ease temporarily the respiratory function or to render the intake of nourishment possible or more comfortable, and with the idea of alleviating pain and prolonging life.

Fig. 8.—*A*, advanced squamous cell carcinoma of the tongue of four months' duration in a man, aged 46, referred by Drs. John B. Deaver and Walter Ziegler of Philadelphia. The cervical glands were involved and treated by the roentgen ray. The tongue was amputated at the line of the tonsils by the electrothermic coagulation method under general anesthesia, without hemorrhage. Little pain or discomfort followed the operation. *B*, result after electrothermic treatment. No local recurrence in two months. This photograph is shown to demonstrate the practicability of amputation of the tongue by the electrothermic method. *C*, tongue in another case immediately after amputation by this method. Note coagulated area at distal end.

The distribution of the cases treated and the results obtained are presented in the accompanying table. A brief outline is necessary to complete the presentation:

1. *Upper Lip.*—Localized: The nine cases of epithelioma of the upper lip, some of which were advanced, though without metastasis, were all treated once by the desiccation method, under procain-epinephrin anesthesia, and there has been no recurrence in from six months to four years.

Fig. 9.—*A*, epithelioma of tongue of six months' duration in a man, aged 74, referred by Dr. J. C. Biddle of Fountain Springs, Pa. *B*, result of desiccation treatment under local anesthesia in May, 1911. There were enlarged glands on both sides of the neck in this case, which were probably inflammatory, since they disappeared after the treatment of the tongue lesion and the application of the roentgen ray to the neck. There was no recurrence in four and one-half years, when the patient died of some other disease.

2. *Lower Lip.*—Localized: The sixty-one localized lower lip cases were all treated under local anesthesia by the desiccation method. There has been no local recurrence in any case in from three months to eight years. In one case a cervical gland became involved two years after treatment of the lip and was excised by Dr. Charles Nassau of Philadelphia, with no recurrence in two years.

Metastasis: Of the three lower lip cases with glandular involvement, the primary lesion was treated by desiccation, and the glands were excised under the same anesthetization and the roentgen ray employed. There was no local recurrence in the lip in any case, but there was recurrence in the neck in two cases from which patients died. There was no recurrence in the third case either in lip or neck in two years.

3. *Alveolus (Upper Jaw) and Hard Palate.*—The thirteen cases involving the alveolus and hard palate were treated by the coagulation method under general anesthesia. In eight there was no recurrence in from three months to three years. Four recurred and were lost track of, while the other one is now under treatment again.

4. *Alveolus (Lower Jaw) and Floor of Mouth.*—Localized: Of the twelve localized alveolus and floor of mouth cases treated by electrocoagulation, six patients have remained well for periods of from three months to four years. Two had no local recurrence, but glands became involved, and four had both local recurrence and cervical metastasis.

CASES OF CANCER TREATED AND RESULTS OBTAINED

	Localized			Cervical Metastasis		
		Result			Result	
Anatomic Location	No.	No Recurrence	Recurrence	No.	No Recurrence	Recurrence
1. Upper lip	9	9	0	0	..	..
2. Lower lip	61	61	0	3	1	2
3. Alveolus (upper jaw) and hard palate	13	8	5	0	0	0
4. Alveolus (lower jaw) and floor of mouth	12	6	6	10	1	9
5. Tongue	15	10	5	6	2	4
6. Buccal surface	14	8	6	7	0	7
7. Antrum	2	2	0	0	0	0
8. Tonsils	5	3	2	2	0	2
9. Pharynx	2	1	1	0	0	0
10. Epiglottis, larynx, base of tongue and esophagus	3	0	3	0	0	0
11. Advanced lesions involving several structures in mouth	13	5	8	23	5	18

Metastasis: Of the ten cases involving the alveolus and the floor of the mouth with metastasis, only one patient has remained free from recurrence, and he has been well three years. Three remained well for periods of from three months to one year, but finally there was recurrence in the neck. In the remaining six, recurrence followed in a short time, and were soon beyond the hope of benefit.

5. *Tongue.*—Localized: Of the fifteen localized tongue cases, seven were treated by the desiccation method under local anesthesia, and eight by the coagulation method under ether anesthesia. There was no recurrence in ten cases in from three months to five years. Two recurred locally, and the glands became involved. These patients were treated again, but unsuccessfully. In three there was no local recurrence, but the glands later became involved. These patients reported too late for further treatment.

Metastasis: The six tongue cases with cervical involvement were treated by combined coagulation, surgery or the roentgen ray. One patient remained well for four and one-half years, when he died of some stomach trouble (Fig. 9).

Another has been well two years. Two had no local recurrence, but there was recurrence in the neck, and two had recurrence both in the tongue and in the neck. They were not treated again.

6. *Buccal Surface.*—Localized: Of the fourteen buccal surface localized cases, eight patients have remained well after electrothermic treatment for periods ranging from four months to four years. The other six cases recurred either locally or the glands became involved, and they were not treated again.

Metastasis: Of the seven buccal surface cases with glandular involvement, all recurred either locally or in the neck, and soon were beyond hope.

7. *Antrum.*—The two antrum cases were treated first surgically and then by electrocoagulation. There was no recurrence in one case in fifteen months and in the other in two years.

8. *Tonsils.*—Localized: Of the five localized tonsil cases, three have not recurred in from one to two years. Two had local recurrence and the glands became involved and could not be treated again.

Metastasis: Both cases recurred locally in the neck and were not treated again.

9. *Pharynx.*—One case soon recurred locally, but the patient is well three months after a second treatment. The other recurred locally and involved structures that were inaccessible and could not be treated again.

10. *Epiglottis, Larynx, Base of Tongue and Esophagus.*—These three cases were all unsuccessful. One patient died of pneumonia a few days after treatment, probably owing to aspiration of secretions, a preliminary tracheotomy not having been performed. The second patient died of secondary hemorrhage two weeks later. There was recurrence in the third case, and a second operation was not attempted.

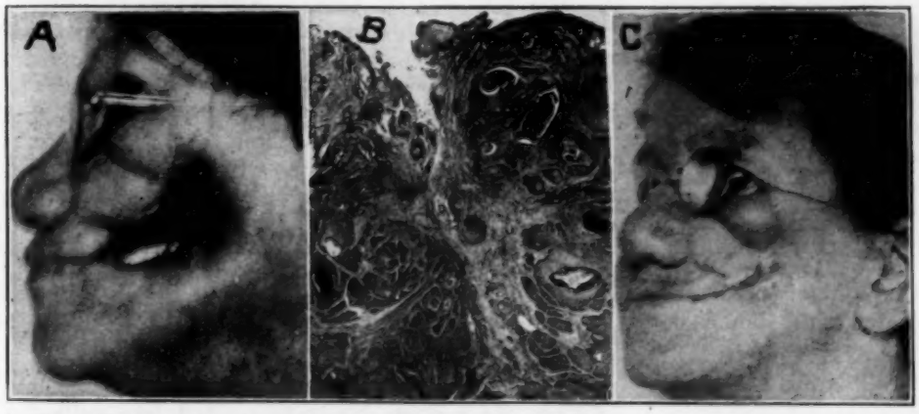

Fig. 10.—Squamous cell carcinoma involving antrum, alveolus, hard palate and buccal surface on left side in a woman, aged 60, referred by Dr. E. B. Miller of Philadelphia. Since involvement was extensive in this case and some of the diseased tissue was inaccessible, preliminary surgical removal was done by Dr. G. M. Dorrance, followed immediately by electrothermic treatment. *A*, result of this treatment. No recurrence in fifteen months; *B*, low power photomicrograph (showing prickle cells) on which diagnosis was based; *C*, result of plastic operation in which tissues were separated from bony attachments, and cheeks drawn together and sutured.

11. *Advanced Lesions Involving Several Structures in Mouth.*—Localized: Five of these thirteen patients have remained well for periods ranging from three months to two years. In the remaining eight cases there was local recurrence, and the glands became involved, rendering them hopeless.

Metastasis: Of these twenty-three cases, five remained free from recurrence from three months to one year. The others all recurred and soon were beyond hope of benefit.

When the lesions recur only locally, there is a chance of success if the patient is treated a second or, indeed, a number of times; but if there is recurrence in the glands of the neck, further treatment is usually of no avail.

The basal cell, or rodent ulcer, type of epitheliomas occurring on cutaneous surfaces, even though advanced and with bone involvement, is so satisfactorily treated by the desiccation and coagulation methods, that these lesions practically all recover when treated thoroughly.

It will be seen that the chances of success in cancer of the oral cavity vary with localization, the anatomic location and the presence or absence of glandular involvement.

The foregoing analysis of results obtained in 200 cases, and the illustrations, will serve to give an idea of the rôle the desiccation and electrothermic coagulation methods can be expected to play in the treatment of cancer of the oral cavity, jaws and throat, and in which types of cases the use of operative surgery, the roentgen ray and radium in combination is justifiable.

Medical Arts Building.

THE USE OF HEAT AND RADIUM IN THE TREATMENT OF CANCER OF THE JAWS AND CHEEKS*

G. B. NEW, M.D.
ROCHESTER, MINN.

Cancer of the jaws and cheeks is one of the most malignant forms of new growth. The type that is primary in the cheek is probably only exceeded in its malignancy by the melano-epithelioma. Little is known regarding the causation of such growths except that chronic irritation of some sort is believed to be an important factor, and, this being true, every snag of tooth or any other source of irritation should be eliminated from the mouth as a prophylactic measure. While tobacco may be a cause in some cases, it probably has not so much importance as is usually attributed to it. The man with cancer of the cheek who chews tobacco has, as a rule, carried the tobacco on the unaffected side of the mouth. Syphilis is undoubtedly a factor in the production of cancer of the tongue, but is of no demonstrable consequence in relation to cancer of the jaw and cheek. Papillary leukoplakia frequently develops into epithelioma, and it should be thoroughly treated with cautery and radium.

Fifty-seven cases of cancer of the jaws and cheeks were examined at the Mayo Clinic during 1917. Thirty-two of the patients were inoperable; four had glandular involvement, but operation was considered advisable and a block dissection was done in addition to the treatment of the local growth. Twenty-one had no glandular involvement and were treated with the cautery and radium. Data concerning these twenty-one patients form the basis of this paper. In most instances epitheliomas occurred in the fifth decade. There were two patients between 31 and 40 years of age; four between 41 and 50; twelve between 51 and 60, and three between 61 and 70. Nineteen were men

* From the Mayo Clinic.

* Read before the Section on Stomatology at the Sixty-Ninth Annual Session of the American Medical Association, Chicago, June, 1918.

and two were women. The patients had first noticed the trouble from two weeks to four years before they came for examination, but it was difficult to determine the length of time the growth had been present or active. The tumor was located on the lower jaw in two cases, on the lower jaw and cheek in seven, on the upper jaw in two, on the upper jaw and cheek in seven, and on the cheek in three. Five of the twenty-one patients had been operated on before coming to the clinic. Seven of the epitheliomas were associated with, and apparently had originated in, a leukoplakia. In one case, the tumor developed on a pathologic fracture of a bone cyst of the jaw.

TREATMENT

In reviewing the literature, it is seen that the usual method employed in the treatment of cancer of the jaws and cheeks has been a complete or partial resection of the jaw with some type of plastic operation if the growth involved the cheek. Recently the cautery has been used in the treatment, but I have been unable to find any report in the literature of a group of cases treated in this manner. At the Mayo Clinic the cautery has been employed for several years in the treatment of such cancers, with a few exceptions, in preference to resection of the jaws. In many instances, the radium has been used following the cautery.

During the year 1917, all the patients operated on were treated by the slow heat cautery with soldering irons, and, in addition, radium was used. While a report of recently treated cases of cancer must necessarily be only preliminary, nevertheless the results have been very encouraging, and I feel that we have obtained better immediate results than were obtained previously in the treatment of cases of this type.

In cases of cancer of the jaw or cheek without glandular involvement, the decision as to whether or not they are surgical depends on individual judgment, but in any questionable case the patient should be given the chance an operation may afford, and everything possible should be done for him.

Before operation, patients are advised that they must return for observation at least once a month during a period of six months or more following operation, so that they may have immediate care, if there is any recurrence. When the seriousness of the condition and the necessity for cooperation is explained, it is usually not difficult to get patients to return at stated intervals.

TECHNIC

After the patient is anesthetized with ether, a mouth gag is inserted opposite the affected side. The tongue is drawn to one side out of the way, by the aid of a stomach clicker. The water-cooled speculum is inserted, and all the teeth in the area involved, or those that prevent good exposure of the growth are removed. If it is possible, the entire growth is excised from the jaw or cheek with a knife cautery, and the base is cauterized with soldering irons. If this is not possible, the irons are inserted into the tumor. The water-cooled speculum prevents the burning of the lips or cheeks except in the area being treated, and it affords good exposure. A wooden tongue depressor holds the tongue out of the way and prevents it from being burned. The cautery should be used longer than seems really necessary; at least for from twenty to forty-five minutes. If the growth is in the upper jaw and involves the antrum, the soldering irons are carried up into the antrum and the entire growth is gradually burned away.

Soldering irons are found to be the most satisfactory type of cautery, as the heating element in the handle of the electric cautery usually interferes with a good view of the area that is being treated. If the irons are too hot, the surface cauterized becomes carbonized and prevents the penetration of the heat. A slow heat that gradually cooks the tumor is preferable.

Occasionally hemorrhage will occur during the first ten days or two weeks following the cauterization while the slough is clearing off and, if it is not readily controlled by packing, ligation of the external carotid with the lingual and facial branches is advisable.

About two weeks after the cauterization, most of the slough will have cleared off, and radium may be applied directly into this open area. It is directed into the ulcerating area on lead applicators, using a 50 or 100 mg. tube within a silver tube, for from fifteen to twenty hours, without screening. If the growth has involved the cheek, radium is applied with screening externally over the cheek, thus cross-firing. If the growth has involved the antrum, the radium is placed in the antrum, packed there with petrolatum gauze, and left in place for the period of hours required by the particular type of lesion.

In from a month to six weeks after the operation, large pieces of sequestrum usually come away from the jaw. These pieces are somtimes one-fourteenth to three-eighths inch thick. In a month from the time the first radium treatment is completed, further treatment is given and repeated as often as the condition indicates. If there is any recurrence noted a second cauterization is done, and this is followed by radium.

Epithelioma of the jaw does not, as a rule, metastasize early, unless there is considerable involvement of the cheek. In such a case, the submental and submaxillary glands on the affected side should be removed.

RESULTS

Of the twenty-one patients treated, twenty were traced; of these, fourteen have been free of local recurrence for from six to eighteen months. One patient recauterized three months previously, thus far has no recurrence. One died of lymphatic leukemia six months after operation; there was no recurrence. Two of the fourteen patients (one with epithelioma of the cheek and one with epithelioma of the upper jaw and cheek) have developed glands of the neck and have had block dissections. Thus twelve of the twenty patients have had no recurrence locally or in the glands for from six to eighteen months. One patient has a hopeless local recurrence. This patient was operated on before coming to the clinic. Two patients died of the cancer; one of these had been operated on before coming to the clinic; one consulted a plaster doctor, and his present condition cannot be learned from his letter. There was no operative mortality.

This group of cases shows that our immediate results in the treatment of epithelioma of the jaws and cheeks without glandular involvement, by the use of the cautery and radium, have been very encouraging. The end-results cannot be foreseen, but we believe that by the addition of radium to the treatment, much more is being accomplished than formerly.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. CLARK AND NEW

DR. A. J. OCHSNER, Chicago: I am not familiar with this method. My observations are based entirely on the treatment of these growths with the actual cautery. I have used this method most successfully. Many of my patients remain well for many years following the use of the soldering iron, whereas if the same growth is removed by the electric cautery or even the Paquelin cautery the result is not so good. I believe that is due to the fact that the heat of the soldering iron penetrates deeper and produces more destruction at a distance from the point of application of the soldering iron. It is quite possible that Dr. Clark's method accomplishes the same thing and in a much nicer way than the soldering irons do. The mortality among these patients when operated on early is practically nil; when operated on late, death in the earlier group of cases was either from shock or from pneumonia. We thought that our successful cases depended on the fact that we destroyed the growths to a very great distance from the originating point and that we held the red hot soldering iron in position for a considerable period of time, that is, we do not brush it back and forth, because in that way you do not reach the depth, so that boiling of the tissues has seemed to be of especial value, and especially so in the cases that are seen early. Of course, these patients do not come to the general surgeon as early as they do to the dentist, so that it is rare that we see a real early case of malignant growth of the jaw. In the last three years we have used the roentgen ray in all cases and radium in a considerable number of cases. In the cases of circumscribed osteosarcomas we have excised the jaw. In the carcinomas we have not done this, but we have cauterized very deeply. In malignant polypus of the antrum we have found many cases that have been treated for a long time on the supposition that they were due to infection of the antrum, and the patients have come late for that reason. In cases of that kind, in which we removed the eye at the primary operation, we have had permanent results. In cases in which we have tried to save the eye we have not succeeded.

DR. BERTHA VAN HOOSEN, Chicago: For three years I have had encouraging results from the use of emetin in the treatment of malignant disease. I have never seen a case of malignant disease of the jaw where the patient did not have pyorrhea or badly diseased gums. Emetin seems to produce a fibrosis. I have at present two patients who, without any operation, are practically cured of malignant disease. One has a squamous cell carcinoma of the labia. The other has a very extensive medullary carcinomatosis and has made wonderful improvement.

It seems to me that in the inoperable cases Dr. Clark might succeed in localizing the disease and making the surrounding tissues more healthy, by starting up a fibrosis, using at least 5 grains of emetin the week before his treatment is begun. Thus he might make it successful in every case instead of the small percentage reported.

DR. ROBERT ABBE, New York: It is not through the blood stream, except where the blood stream has been infected and the metastatic particles are carried in it, but through the lymph channels that we are bound to search for absorption. We have to reach the original infection, and heat, roentgen ray and radium seem to be the agents of choice. That the cells that are wandering away from the lymphatics are more sensitive than normal malignant cells has been proved by biologic study. By electronic action one can produce either a slight or a very marked arrest of growth, or a destruction of those cells. The heat method is one by which the cells in some denfiite area are arrested, destroyed or absorbed. The heat can be driven into these cells, if we go far enough. There is no question but that the lymphatics can be treated at a distance. In the cases of cancer of the mouth spoken of by Dr. New, it seems to me that the question of tobacco as a cause is absolutely proved in nine cases out of ten. If you ask the question of these patients you will find they have smoked to excess three to five cigars a day or a corresponding amount of tobacco in any form, and where the quid is carried in the cheek it is a cause of carcinoma of the buccal site. Dr. G. H. Davis proved that in the Philippines chewing of the Betel leaf was the cause of carcinoma of the inside of the mouth. I believe we can state that tobacco is the cause of most cases of carcinoma inside of the mouth.

DR. WILLIAM L. CLARK, Philadelphia: The success obtained by the use of the desiccation and electrothermic coagulation methods in the treatment of cancer is explained by the fact that the malignant tissue was all destroyed, and when possible with one radical treatment, while at the same time blood and lymph channels were sealed. In cases in which, by error of judgment, some of the diseased tissue was not destroyed, recurrence was the rule; indeed, owing to the stimulation of the electric current, the disease often manifested greater activity than would have been the case if left untreated. In cases of recurrence, however, the electrothermic methods have often been applied twice, or even a number of times, before final success was attained, but the practice of intentionally treating a malignant lesion in a series of electrothermic operations is a reprehensible one, and must be discouraged in no uncertain manner. It is quite as irrational to do this as to excise a cancerous growth surgically in a series of operations with the hope of success. The term "fulguration" is applied in the United States to any type of high frequency spark that will cause the destruction or burning of tissue. Fulguration used in this sense is a misnomer, since the original deKeating-Hart fulguration method does not destroy tissue, but is applied to the field of operation after radical surgical ablation of cancer in the form of long high-tension sparks, not for the purpose of destroying tissue, but to alter local nutrition, and it is claimed by Hart, Bainbridge and other advocates, that recurrences are less frequent when fulguration is used in combination with surgery, than when surgery is used alone. I have had insufficient experience with this method to venture any comment on the truth or fallacy of this claim. I may say, however, that the pseudofulguration method employed in this country means little, as the destruction or burning of tissue by any sort of high frequency spark whatsoever is called "fulguration," hence, in the hands of different men, entirely different effects on the tissues may be produced.

The indiscriminate use of the high frequency spark in the treatment of cancer by frequent applications and incomplete destruction has justly brought the destructive fulguration method into disrepute. The term fulguration should be abandoned, except when used according to the technic of deKeating-Hart. On the other hand, desiccation and electrothermic coagulation are descriptive of the actual effects on the tissues, and these effects are produced by definite types of high tension electric currents of known strength, capacity, inductance and resistance, and the methods are so standardized that they may be duplicated over and over again by any physician possessing the requisite appliances and who has learned how to use them.

It is also desirable that the operator should have a good surgical training and a comprehensive knowledge of anatomy.

DR. GORDON B. NEW, Rochester, Minn.: In regard to the point concerning tobacco that Dr. Abbe has brought up: Too much stress has been put on the effect of tobacco as a cause of cancers of the mouth and lip, although undoubtedly there are a large number of cases of cancer in which tobacco is a factor. Among 196 patients with epitheliomas of the lip treated at the Mayo Clinic during the past twelve months, 33 per cent. did not use tobacco at all. Since this is about the percentage of men who do not smoke, it does not bear out the high percentage of cases in which tobacco is a factor.

Cold Conduces to Shock.—Exposure to cold has a marked effect in inducing or augmenting the state of shock. A badly wounded man leaves the front-line trenches in a fair condition, but during his journey to the rear he loses heat by sweating and exposure, and then passes into the shocked state. His condition is likely to be much improved when he is placed in a warm bed and supplied with sufficient heat to restore his normal temperature. It seems probable that cold, which is known to cause stagnation of blood capillaries, increases the "lost blood" by helping to induce capillary stagnation.—*Review of War Surgery and Medicine.*

TREATMENT OF VERTEBRAL TUBERCULOSIS BY FUSION OPERATION

REPORT OF TWO HUNDRED AND TEN CASES *

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In these 210 cases of vertebral tuberculosis, the patients were operated on at the New York Orthopedic Hospital in the period of January, 1911, to January, 1915, so that at this date, June, 1918, seven years have elapsed since the earliest and three and one-half years since the latest patient was operated on. This is a sufficient length of time to make possible a fair estimate of the influence of the operation on the course of the disease.

The operation was designed and its technic perfected with the single object of eliminating motion of the diseased articulations, experience having proved that the limited motion obtained by various mechanical means, such as braces, corsets, etc., was beneficial. It was felt that absolute elimination would hasten the cure and perhaps prevent deformity. The absolute elimination of motion in any joint is accomplished only when the bones entering into its formation become fused. This is possible only when all tissue other than osseous is removed or destroyed from between their articular ends and new bone formation fills the gap. This is sometimes accomplished by nature without operative aid. In the case of a vertebral joint affected by tuberculosis, however, nature is too slow. The spinous processes, laminae and lateral articulations are rarely involved. Their easy accessibility and close approximation make them peculiarly well adapted for operative fusion.

OPERATION

An incision is made through the skin and subcutaneous tissue from above downward over the spinous processes of the segment to be fused, exposing the tips. The periosteum over the tips of the first two spines above is split and the interspinous ligament between. With a periosteal elevator these are bared of periosteum for about one half their length. Small packs of gauze are now inserted to prevent oozing. The periosteum of each tip and the interspinous ligament between is split in turn, and the periosteum is freed from the bone and treated as described and so on including each vertebra to be fused.

Beginning at the upper end again, with a dull periosteal elevator for children, and a sharp one for adults, the operator separates the periosteum farther forward from the spinous processes and laminae to the base of the transverse processes, exposing the lateral articulation. Each vertebra is treated in this manner from above downward and packings inserted as noted. These packs are very important, as they keep the operative field dry.

Beginning at the upper end again with a small curet, the operator curets the lateral articulations and removes the periosteum and ligament from the adjacent edges of the laminae and bases of the spinous processes. This is done with each vertebra in turn over the entire field, with packs inserted as described.

Beginning at the upper end again with a small chisel, the operator elevates a piece of bone from each lamina and turns it from above downward, its free end resting on the one next below. Each in turn is so treated with packings inserted afterward.

With the operator beginning at the upper end again with a bone forceps, each spinous process is carefully cut and fractured, so that its tip rests on the bare bone next below. The periosteum and ligament which have been split and pushed to either side and lie in practically an unbroken sheet, are brought together in the middle and sutured with interrupted sutures of ten-day chromic catgut. The subcutaneous tissue is closed by a continuous suture of plain catgut. The skin wound is closed with a continuous suture of ten-day chromic catgut. Sterile dressings are applied and an immobilizing brace.

Summary: All tissue other than osseous has been removed from between the lateral articulations, the laminae and the spinous processes, and bone contact is secured at the lateral articulations, the laminae and the spinous processes, so that with the periosteum closed, we have practically a tube of periosteum filled with live, healthy bone, lying in continuous contact and insuring a perfect fusion.

Great care should be exercised in the removal of all tissue from the bones, as the area of fusion will be determined absolutely by the thoroughness and extent of the dissection. If the dissection is made subperiosteally, there is absolutely no difficulty from hemorrhage, and the whole operation may be done with practically a dry field.

The number of vertebrae to be fused in each case is determined by the extent of the disease. Great care should be exercised that two healthy vertebrae are included at either end. As will be seen later on, in some cases a sufficient number of vertebrae were not included, and it became necessary to perform a second operation.

The patient is kept quiet in bed for eight weeks after the operation and continues to wear a brace for from six months to a year. The form of brace used is the Taylor model, because it is accurate, and is the most efficient means of securing immobilization after operation. It is always fitted to the patient before operation, and is, therefore, perfectly comfortable.

In this group of cases, there has been no operative mortality and all the wounds have healed by first intention. There has been practically no shock in any case.

In dealing with these patients, we have always had in mind the fact that they were suffering from tuberculosis, and, when possible, every influence, such as good food and good air, has been brought to bear on them. An attempt has been made to keep every patient under constant observation, and in most instances this has been done by the visiting nurses and our dispensary department. The patients all come from among the poorer classes and most of them live in crowded tenements.

No attempt has been made to select cases. Every patient with Pott's disease who would consent to operation and whose general condition warranted the administration of an anesthetic, was operated on, regardless of other complications or the extent of the disease. I believed that the operation would hasten the cure of many and for those in whom cure could not be expected, it would at least contribute to their comfort. Most of these patients had had some form of brace or jacket treatment before operation.

* Read before the Section on Orthopedic Surgery at the Sixty-Ninth Annual Session of the American Medical Association, Chicago, June, 1918.

RESULTS OF OPERATIONS

The first patient was operated on Jan. 9, 1911, and during the intervening period 210 patients have been operated on. One hundred and fifty-seven, or 74.7 per cent., were cured. Twenty-two cases are doubtful cures, and thirty-one patients are dead. In the classification of the cured cases, every one concerning which there is the slightest doubt has been excluded and only those included which show no evidence of disease, as determined by the most careful examination, with complete knowledge of their history since operation. The patients have all been examined by the staff working as a group within the past month. Photographic, roentgen-ray and tracing records have been made of every case before operation and at frequent intervals since, and it is felt that among all those recording deformity, the most reliable records are carefully made tracings. The results are set forth in the accompanying tables.

In many of these cases, a definite fusion of the bodies also was shown by the roentgen ray. This would be expected only in the articulations of which the cartilage had been destroyed by disease.

Deformity.—In 139 cases there was no increase in deformity. In eighteen cases there was definite increase. In all cases, there is an amount of diminution in the deformity from the operation, which is due to a transposition of the spinous processes. This is of some importance to the patient.

TABLE 1.—AGE OF PATIENTS AT TIME OF OPERATION

No. Cases	Age*	No. Cases	Age*
2	between 1 and 2 years	6	between 15 and 20 years
27	between 2 and 4 years	5	between 20 and 30 years
22	between 4 and 6 years	3	between 30 and 40 years
47	between 6 and 10 years	2	between 40 and 50 years
43	between 10 and 15 years		

*The average age was 14 years plus.

TABLE 2.—DURATION OF DISEASE AT TIME OF OPERATION

No. Years*	No. Cases	No. Years*	No. Cases
Less than 1 year	38	From 6 to 10 years	28
From 1 to 2 years	17	From 10 to 15 years	18
From 2 to 4 years	30	From 15 to 20 years	1
From 4 to 6 years	25		

*The average duration of disease at the time of operation was 4.6 years.

No attempt has been made to correct deformity by the exercise of force at the operation. The definite increase of deformity in these eighteen cases is certainly not due to destruction of bone, therefore it must be due to a developmental change, as they were all cases of disease among growing children.

Every patient in this group is living the normal life fitted to his age, either at school or at work.

There were five deaths of patients who were definitely cured of Pott's disease; two of these died of heart disease and three of pneumonia. These cases could be fairly classified as cured, but they are not included in the 157 cases.

Doubtful Cures.—There were twenty-two doubtful cures. These include every case in which the patient is not now in good condition, whether the local disease seemed cured or not, and also include two cases which had disease of the laminae at the time of the operation.

Three of these patients now have active lung tuberculosis. Two others are in school wearing braces. Two have remained paralyzed, although the fusion is complete and there is no evidence of active disease. In one case, the fusion is complete but the patient is not doing well. Three other patients are still under treatment and doing well, and the remainder have not been seen recently.

Patients Who Have Died, and Causes of Death.—Of the thirty-one who are dead, twenty-six patients were definitely not cured. All but five, however, improved to a considerable degree for a time after operation. One worked a while, and seven went to school. The cause of death in thirteen cases was miliary tuberculosis. The average age of the patients was 6.7 years. The average duration of disease before operation was 3.8 years. The average time that elapsed after operation was 2.4 years. Four of the thirteen patients were in fairly good condition before operation, and nine were in poor condition. Fusion was perfect in all but three cases. One of these had a pseudarthrosis, and in two cases the fusion was short. In one, a necropsy was done and the fusion was found complete but short.

TABLE 3.—NUMBER OF VERTEBRAE INVOLVED.

No. Cases	No. Vertebrae	No. Cases	No. Vertebrae
19	2	14	7
35	3	7	8
23	4	3	9
32	5	2	10
20	6	1	11

TABLE 4.—REGION OF DISEASE INVOLVED

Cervicodorsal	6	Lumbar	28
Dorsal	71	Lumbosacral	2
Dorsolumbar	50		

Five patients died of tuberculous meningitis. The average age of these patients was 7.6 years. The average duration of disease before operation was 3.9 years. The average time elapsed after operation was 1.3 years. One of the five patients was in fair condition before operation, and four were in poor condition. The fusion was complete in all but one case, and in that it was too short. .

Four patients died of pulmonary tuberculosis. The average age of these patients was 12.7 years. The average duration of the disease before operation was 8.1 years. The average time which had elapsed after operation was 2.6 years. All were in poor condition before operation. The fusions were complete.

Three patients died of pneumonia. The average age of the patients was 5.3 years. The average duration of disease before operation was 2.5 years. The average time that had elapsed after operation was four years. All were in good condition and the fusions perfect.

TABLE 5.—GENERAL CONDITION OF PATIENTS BEFORE OPERATION

Condition	No.	Condition	No.	Condition	No.
Poor	54	Fair	66	Good	37

TABLE 6.—DURATION OF TIME SINCE OPERATION

Time Elapsed,* Years	No. Cases	Time Elapsed,* Years	No. Cases
3½ to 4	40	6	51
5	46	7	20

*The average time was 5 years plus.

Three patients died of amyloidosis. The average age of these patients was 4.3 years. The average duration of disease before operation was 1.5 years. The average time which had elapsed after operation was 3.3 years. All were in poor condition at the time of operation. The fusions were complete. Two had abscesses which discharged until death. One closed before death.

Two patients died of heart disease. Their average age was 11½ years. The average duration of the Pott's disease before operation was six years. The average time which had elapsed after operation was four years. One was in good condition and the other in fair condition before operation. Fusion was complete in both cases.

One patient, aged 2 years, died of septic meningitis, following mastoid operation. The duration of Pott's disease before the operation was one year, and after operation, three years. The condition was good and the fusion perfect.

One died of miliary tuberculosis eight weeks after operation. This patient was in very poor condition before operation, having a large psoas abscess and pulmonary involvement. Three vertebrae were involved in the disease which had had a duration of one year. Necropsy showed a perfect fusion.

One other patient died of miliary tuberculosis four months after operation. This patient was also in very poor condition before operation. The duration of the disease had been one year and three vertebrae were involved. Two patients died six months after operation. One had tuberculous meningitis, and the other miliary tuberculosis. The remaining cases go to make up the general average of three years.

It will be interesting to note that the general average life of the patients who died after operation was three years, and it seems fair to suppose the operation may have prolonged their lives as it certainly contributed to their comfort.

Patients Still Living But Not Cured.—There are five patients living who are definitely not cured. Three have disease of the sacrum and two have fusions which are too short. Two of the sacral patients probably had the disease before operation as the fifth lumbar was partially destroyed, suggesting that the first sacral region was involved. According to our records, the third case showed involvement which included only the third lumbar region. Fusion was made to the fifth and symptoms did not clear up, so it is probable that the sacrum was involved at the time of the operation.

Patients with More than One Focus of Disease.—Three patients each had a double focus. One had both foci in the dorsal region, two had a focus each in the dorsal and the lumbar, and one developed a second focus in the lumbar region following operation for a focus in the dorsal. In two of the cases, both foci were included in the first operation, and the third patient was reoperated on for the second focus. Two of the patients were among the definitely cured. One is among the doubtful.

Cases Showing Cord Pressure Symptoms.—Of the total number of patients, thirty-five showed cord pressure symptoms. Of these twenty-six were completely paralyzed, and nine slightly spastic, with exaggerated reflexes. One was in the cervicodorsal region, twenty-two in the dorsal, eleven in the dorsolumbar, and one in the lumbar. Thirty of these cases were completely cured of their paralysis and Pott's disease, and are included among the cured cases. Of the five remaining, two are living and apparently cured of the disease, although still paralyzed. Three of them are dead, one of whom developed paralysis after operation, was reoperated on and died of amyloidosis. The other two died of miliary tuberculosis. Two of the dead had disease in the dorsal region, and the other in the lumbar. Of the two living, one patient had disease in the dorsal and the other in the dorsolumbar region. The existence of paralysis is obviously no contraindication to operation.

Cases of Psoas Abscesses.—There were sixty-seven patients who had psoas abscesses. In fifty-six cases, the abscesses were single, and in eleven cases they were double. Twenty-three patients had dorsal disease, twenty-six had dorsolumbar, and seventeen lumbar. One had disease in the lumbosacral region.

Of these, forty-two patients were cured of the abscess, eleven of them being affected in the dorsal region, seventeen in the dorsolumbar, and twelve in the lumbar. Eight of the abscesses were double and thirty-six single.

Twenty-five patients were not cured. Ten were affected in the dorsal, nine in the dorsolumbar, five in the lumbar, and one in the lumbosacral region. In four cases in which the abscesses were double, one patient died of pulmonary tuberculosis, and three are among the doubtful cases. Nineteen were single. Ten of the single cases are among those classified as dead, and five among those classified as doubtful. Four patients remained the same.

The existence of abscess, whether open or closed, is no contraindication to operation, provided it is not in the field of operation.

Cases Complicated by Tuberculosis of Other Joints.—There were twenty-one cases complicated by tuberculosis of other joints. One patient had tuberculosis of the elbow, knee, and ankle. Pott's disease was apparently cured but the case is classified among the doubtful, the other joints being active. Three had involvement of the hip. One in whom the hip was not cured is classified among the doubtful. In the other two cases the hips were cured as well as the Pott's disease.

Twelve patients had knee joint involvement. In three patients the knees were not cured and in nine they were cured. In one case the disease developed after operation, the patient dying of miliary tuberculosis. In the other eleven cases, the Pott's disease was definitely cured and the patients are classified among the cured.

Two patients had involvement of the ankle. In one the ankle was cured and in the other it was not. In both cases the Pott's disease seemed cured, but only one is classified as such.

There were three cases of shoulder joint involvement. In neither patient was the shoulder cured, but in both, the Pott's disease was definitely cured and is so classified.

One patient had disease of the sternum. The Pott's disease was definitely cured and is so classified. The sternum was practically cured.

Cases of Fusion Found at Operation.—In thirty-four cases fusion of vertebrae was found at operation. The age of the patients in three cases was from 3 to 6 years; in ten cases from 6 to 9 years, in five cases from 9 to 12 years, in thirteen cases from 12 to 15 years, and in three cases more than 15 years. Four patients had dorsolumbar disease, six had lumbar, twenty-three dorsal, and one cervicodorsal. The duration of the disease at the time of operation was less than one year in two cases, from one to four years in two cases, from four to ten years in twenty-two cases; from ten to twenty years in eight cases. In five cases, fusion was found to include all the diseased vertebrae. In three of these cases, the disease was

dorsal, in one dorsolumbar, and in one lumbar. From two to eight vertebrae were involved. In eight cases fusion was found to include two vertebrae, in ten cases it included three, in two cases it included four, and in five cases it included five. In two cases six were included, in one case seven, and in another nine. Thirty of these patients are in excellent condition. One is in poor condition and is classified as not cured. Two have been lost track of, and another is still receiving treatment. These last three are classified as doubtful.

Postoperative Deformities. — In considering this aspect of the cases, we must remember that the transposition of the spinous processes immediately lessens the deformity in all cases. In seventeen of the cases, however, deformity has decreased more than can be explained by this fact. Six of these cases were in the lumbar region, and although the patients had definite deformity at the time of operation, they have absolutely none now. In 141 cases the deformity remained the same or was slightly less.

In thirty-six cases there was an increase of deformity. There was a slight increase in twenty-four of these cases. In fifteen of the twenty-four patients, the fusion was apparently short, though nine of the patients were definitely cured, and are so classified. Two of the nine were explored and the fusion found complete. One of the fifteen died of miliary tuberculosis. Three others were reoperated on, the fusion was extended and the symptoms subsided. The patients are classified as cured. The other two had disease of the laminae. The disease is probably still active and the cases are classified as doubtful. Nine patients showed a slight increase in deformity, although fusion was apparently complete. They are well and in school and classified as cured.

In twelve of the thirty-six patients, there was a marked increase in deformity. In eight the fusion was too short and in four there was a pseudarthrosis. Of these patients in whom the fusion was too short, five were reoperated on, and there has been no increase since. Of the remaining three, one is in bad shape and refuses reoperation. The other two were taken from the operating table without completion of the operative work. Both died later of miliary tuberculosis. In the four cases of pseudarthrosis, three of the patients were reoperated on and cured. The fourth was reoperated on but died later of amyloidosis.

A study of the region involved in these cases shows that nineteen were in the dorsal region, ten cases in the dorsolumbar, and three in the lumbar. Of the dorsolumbar cases three included involvement of the two lumbar vertebrae. The remaining seven included only the first. Two of the pseudarthroses were in the dorsal and two in the dorsolumbar. Those in the dorsolumbar region included involvement only of the first lumbar.

Eighty-three per cent. of the 210 cases showed less deformity or no increase.

Seventeen per cent. of the 210 showed an increase of deformity. Fifteen per cent. of these had fused areas that were too short and in 2 per cent. there was a failure of fusion at one point as evidenced by pseudarthrosis.

Results of Fusion Operation Where Duration of Disease Was Less Than Six Months.—It must be considered here, as in all the cases, that the parent's history as to duration is not entirely reliable. There were seventeen cases. Thirteen patients are now in excellent condition although two had to be reoperated on for a short fusion. One was in excellent condition before he died of pneumonia. One we are unable to trace but was in fair condition when last seen. One is dead of miliary tuberculosis. One now has definite sacral disease. This gives a percentage of 82 cures as compared with the general average percentage of 75. It will be noted that eight of these seventeen patients had symptoms of cord pressure. All were cured. It is also interesting to note that one patient had a vertebral involvement of four. Eight cases had three, and eight had two vertebrae involved.

Patients in Very Poor Condition Before Operation.—In the 210 cases there were eighty-seven in poor condition before operation. Fifty-three of these are now in good condition and considered cured. Twenty are dead, two from pneumonia, both of whom were in good condition before death. Six have been lost track of. Two had pulmonary tuberculosis before operation and the disease is still active. Two are not in very good condition although one has apparently a perfect fusion and the other has a fusion that is short. One patient is still paralyzed but is in good condition. He is not considered cured. One has hip disease, and while the Pott's disease is apparently cured, it is not so considered. One has active disease of the sacrum and is counted among those not cured. The last one has heart disease, having been cured of Pott's disease.

Miscellaneous.—There were five patients with disease of the spinous processes and laminae. Two of these patients were affected in the dorsolumbar region. One of them is dead of miliary tuberculosis, with incomplete fusion, and the other is in good shape and has a perfect fusion. The other three patients were affected in the dorsal region. One patient is in fairly good condition with complete fusion. Another shows increased deformity and is not improved. The third has a short fusion. Only two of the patients are considered cured.

It is interesting to note here that disease of the spinous processes and laminae does not always prevent their fusion.

Patients Who Had Bone Graft.—Three patients in the series had had previous bone graft operations at other hospitals, one of which was done in the dorsal region, and the other two in the dorsolumbar. There was no fusion in any case, and all the patients had symptoms of active disease, one with six discharging sinuses from two psoas abscesses. In two cases, there was only a small piece of bone of the graft remaining in one spinous process. In one case there was a thin piece of continuous bone in the tips of three spinous processes. Perfect fusion was obtained in all three cases and the patients are among the cured.

The average age of patients of the whole group at the date of operation was 8.9 years. The average duration of disease before operation was 4.4 years.

CONCLUSION

This study gives convincing evidence that by this operation a fusion of the vertebrae may be obtained in every case in which a careful dissection is made, as in only four cases has fusion failed to take place at one point in the operated area, and in these it was undoubtedly due to imperfect operative technic. It seems equally convincing that the effect of fusion on these cases has been to hasten the cure of the dis-

ease and to limit the progress of the deformity. If this can be accomplished in a series of patients who had had the disease for an average of 4.4 years at the time of operation, is it not fair to conclude that had they been operated on earlier in the disease their cures would have been quicker and the deformity less, and does it not suggest that all cases of vertebral tuberculosis in any region of the spine should have a fusion operation at the earliest possible moment?

ABSTRACT OF DISCUSSION

Dr. Charles M. Jacobs, Chicago: I have operated in only two cases of tuberculous spine disease by what I believed to be the Hibbs method. It then occurred to me that either there was something radically wrong with the method or with my technic. I went to New York, unfortunately finding Dr. Hibbs suffering from an attack of lumbago, and therefore was unable to see him operate. His assistant told me that to get an accurate idea of the technic of this operation it is necessary to see Dr. Hibbs operate, as there is as much difference between his "description of the operation and his technic as there is between darkness and daylight." Probably this is the reason why the Hibbs operation is not performed more often.

My surgical experience in tuberculous spine disease is based on the bone transplantation method. There can be no doubt that surgical measures for tuberculous spine disease are a great advance over conservative treatment, but they should be restricted to selected cases. Undoubtedly they shorten the period of disability. My own private patients seldom are operated on, because I believe that in children the length of time necessary to a cure plays no important part. If, however, treatment must be carried on beyond the average time, which is about four years, or if deformity continues to increase, then I advise operative procedure. My clinical patients are practically all subjected to operation, because they must regain health in the shortest possible time; therefore, conservative treatment in their case demands a sacrifice justified only by a necessity which I consider no longer exists.

In Dr. Hibbs' series of 210 cases taken from the New York Orthopedic Hospital and Dispensary, which, of course, are the poor class of patients, 157 patients were cured; in thirty-five cases there was paralysis and in a certain number cold abscesses occurred. Following his operation he stated that a brace was applied. I did not hear him state in what period of time a cure occurred, or how long the brace was applied.

I should like to ask Dr. Hibbs whether he operates in all cases of tuberculous spines—on private as well as dispensary patients—also, what effect his operation has on paralysis and abscesses. We know that children who are suffering from Pott's paraplegia usually get well on a Bradford frame without operation in an average period of one year.

Dr. Willis C. Campbell, Memphis, Tenn.: I have done only two of these operations. The trouble is in not seeing the operation after reading the description. It really is a difficult procedure, and one in which it is necessary to see the actual work before you can thoroughly understand it. One of my patients was a very poor risk, being quite old, and after operation I learned that he was a morphin habitué. He died of sepsis, of course, through no fault of the operation. In the other case, the laminae were diseased, also the spinous processes. In that case I obtained a good result. A plaster cast was applied and was worn six months. The patient has been without it now for over a year, without recurrence of symptoms. Of course, I do not class that patient as cured, because there has not been sufficient time.

There are five points of fusion in the Hibbs operation. I have often heard it said that the spinous processes will not unite; but even if they do not, there are the laminae on both sides, making two other points, and the articular processes, so that we have a chance of fusion at five points, with little chance of failure, if the work is done accurately.

Dr. Fred J. Gaenslen, Milwaukee: Dr. Hibbs mentioned that in a number of his cases the lessening of the deformity was greater than he could account for by the deflection of the posterior spinous process. I should like to know whether he thinks that growth was responsible for this improved appearance.

Dr. Henry B. Thomas, Chicago: I have had a number of tuberculous spine cases in which I have operated according to the Hibbs method, guided by what Hibbs had written. I did not know his method thoroughly until I actually watched him operate. Now, after I have carefully studied nature's cure of tuberculous spines when not aided by operation, and seen in the skeleton how ankylosis probably began first around the laminae and the bases and tips of the spinous processes, and last about the necrotic bodies, I am convinced that what Dr. Hibbs does in his operation, in twenty or thirty minutes, is to prepare the field, the normal neighboring bone, for ankylosis, exactly as nature prepares it after the bodies of the vertebrae have given way so much by the decay as to allow the posterior parts of the spinal column to drop down so that they can rub off their periosteum and prepare for ankylosis. This is the beginning of fixation. Hibbs advocates a preparation in a few minutes' time which nature would require a year or so to complete. There is no doubt the first ankylosis which takes place is between good bone around the laminae posterior processes and in the articular processes. After nature gets that fixation by means of the good bone and removes the debris from the decayed bodies, these then, after a year or two, ankylose. In my judgment, if we have an operable case of Pott's disease, the Hibbs method is preferred.

Dr. Russell A. Hibbs, New York: In the first place, as to the question of whether the advice that I have given to the hospital patients applies to my private patients, let me say with all the emphasis possible, Yes. I have not a single private case of Pott's disease under my care today that has not been operated on in this way, and I do not want one. As to the effect of the operation on paralysis, of course, the operation, as such, has no effect on paralysis. The only effect it has is by its curative effect, if it has any, on the active tuberculous disease of the vertebrae. The operation has but one object, and that is the elimination of motion; and if by that it hastens the cure of the disease, it also hastens the cure of the paralysis and every other symptom of the disease; and if it does not hasten that, it does not hasten any of these things.

I have waited this long time before making a report of this work because it takes so long to see the final results, and only by and study of the final results can any fair estimate be made of the value of the operation.

Railroads and Malaria in the South.—R. C. Derivaux, of the United States Public Health Service, in *Public Health Reports*, Aug. 2, 1918, discusses the relation of the railroads in the South to the prevalence of malaria and its control. He shows that the railroads of the South have in many instances not only contributed to the spread of malaria by the promotion of conditions along the right-of-way which have fostered mosquito breeding, but they have also suffered economically from the morbidity from malaria among their employees. Recognizing this fact, many of the railroads have begun efforts to improve conditions in this respect. The St. Louis and South Western Railroad has taken up the matter of malaria prevention, and already has accomplished considerable in this direction. It was found that about 25 per cent. of all admissions to the hospital at Texarkana were for malaria. An average of 640 patients were treated for five days each year during the past four years. This was equivalent to about 4 per cent. of the total number of employees. Efforts at prevention were begun in 1917 at certain points along the line. In 1916, thirty-two malaria patients were admitted to the hospital at Texarkana; in 1917, following malaria work, only thirteen patients were admitted, a reduction of 59.4 per cent. The sale of quinin had decreased about 49 per cent. Among bridge and building gangs, whose bunk cars were screened, a reduction of 47.7 per cent. was obtained in the number of cases of malaria in 1917 over 1916. At one point in a small lumber community where malaria had been severe, after one year of work practically no malaria occurred, and the mill increased its output 20 per cent.

STATE RESPONSIBILITY AND AIMS IN COUNTY HEALTH WORK *

J. N. HURTY, M.D.
INDIANAPOLIS

It is plain that most of the relations and responsibilities of states to counties are very different from the relations and responsibilities of the national government to states. In comparing national and state reciprocal responsibilities, therefore, we shall probably not find any facts or considerations to aid us. As counties are decreed, defined and empowered by states, we perforce recognize that state responsibilities are fundamental, and aims must be on high levels, not only in the matter of health, but in all ways.

Under our democratic form of government, the state should have a wise general health law, clearly prescribing duties and powers that counties should have for doing successful public health work. But the utmost possible freedom should be accorded to enable the inhabitants of counties to work out their own salvation according to their abilities. It would be necessary, for a state health law to secure live, progressive counties against the stupidity, blunders or inaction of those that might be slow or retrogressive. In other words, state responsibility requires that, under carefully defined conditions, the central power may proclaim for a county what is reasonable and necessary to protect the reasonable rights of other counties. All of this would truly be making democracy safe for the world, which is the first step in making the world safe for democracy. I believe the North Carolina health law very fully recognizes these principles, and under the present direction is achieving excellent results.

As speeding up is sometimes not only desirable but also necessary, I would consider it a responsibility for most states to command that counties or groups of counties should employ skilled all-time health officers, should follow a uniform outline or procedure in public health work, should give a fair living compensation, and provide a reasonable health fund, leaving open every reasonable opportunity for individual initiative. If these fundamentals are not secured, lopsided work for the whole state area would most probably result, and a state map showing results might be as spotted as a leopard.

It is not enough that, for their health work, counties should be held accountable only to themselves; the state, therefore, should command an accounting because of state responsiblity. This accords with the accepted principle that "No man can live by himself alone." Undoubtedly, very full initiative and freedom should be accorded, but the limitations outlined are responsibilities which states surely carry.

I believe that a state's responsibility extends to providing for sloughing off incompetency in county officialdom, and therefore, if a county does not slough off its incompetent officials, then the state should attend to this important matter, which is essential to all successful government. Again, it is necessary that health officials, as well as all other officials, should keep up with the times. Present day statesmanship, therefore, recognizes as the first requirement of progress a constant reexamination of the entire structure of government to see if its fundamentals are correct and if the various parts are doing the work assigned to them. Perhaps we heard in years past too much of freedom and liberty and independence, and not enough about fulfilment of duty and obligation of service. These momentous days have brought quickly the lessons of mutual dependence, and they must instil the idea of discipline.

Still, that is not enough. To a new degree we must be interested in each other. The parents who raise a family of sturdy defenders of the nation will be assured that other parents are doing as much, so that their own labor will not have been in vain.

These general thoughts have application to a set of facts brought to light in the public health administration of Ohio outside of the larger cities. The state health authorities say it is almost worse than nothing in rural districts, and the same authorities of Indiana have testified to almost like effect as to the same conditions in that state.

This is a new offense to be charged to the rural districts whose representatives are constantly ready to represent the cities as centers of evil. Perils of typhoid and other infections, perils of child neglect and of blighting disease, certainly come in no small degree from the country to the city. Here is a state responsibility in county health work. The larger cities are keenly interested in their health departments and in having trained health officials, and city people now loudly demand the ministrations of hygiene. On the other hand, it has been shown that the administrative health positions in the county areas go to those who have done political work or who are appointed because of political affiliations. It is plain that the larger cities with lower morbidity and mortality rates and better care of infants and children will not long submit to surrounding unhygienic conditions.

A method of this character cannot endure, and the wildest dream of liberty would not wish its continuance. Rural domination over cities has long been submitted to, but now things have come to such a pass that for self-protection in health affairs, cities will have an interest in and insist on better rural hygiene. Likewise, it is time to do away with a system that does harm to both city and country.

If counties will not, after instruction, do that which is necessary for their own and their neighbors' health and comfort, then it will be the state's responsibility to take up the work.

As to state aims in county health work, it has already been said that aims must be high and noble. The first principle is that the people must secure better health and still better health, mostly through individual hygiene. The submerged, the almost submerged, and those whose heads just protrude above the flood of incompetence and ignorance, must be forced to be virtuous and to keep in the narrow path of health. Those who are only waist deep in the same flood may be instructed and led, and those who ride on the flood will be doers, instructors and leaders. The strong man does not need looking after, for he looks after himself and others. At the same time the strong man is to blame for the ills of society, for he is the only hope for their prevention. And let us note here that custodial care of the victims of the neglect of hygiene will not make health for a people. The state aims in county health work are the same as for everywhere else, namely, to cease the fostering of the production of low-grade nonresisting stock, for the individuals of such stock cannot learn and will not conform to the laws of their well being.

* Read before the Section on Preventive Medicine and Public Health at the Sixty-Ninth Annual Session of the American Medical Association, Chicago, June, 1918.

ABSTRACT OF DISCUSSION

Captain René Sand, Belgium: One of the principal effects of the war is to have demonstrated to the authorities and to the nation at large how desirable, useful and even indispensable public health work is. Of course, I consider the problem differently from what you do because you have immediate necessities and we, in Belgium, look forward only to the situation as it will be after the war. Therefore our views are necessarily more general. After the war we will have to enlist in the public health service every physician of the country. I do not know, of course, exactly what the situation is here, but I think that finally if you consider every phase of the problem the best way to have good health service, to have hygiene entering into every household, would be to make every doctor in the country, at least every doctor who is willing to do so, an agent of the public health service and to give him some remuneration for his services. We see in our country, and it is the same in France and other continental countries, a certain amount I would not say of diffidence, but nevertheless the public health service goes along more or less indifferently with the general practitioner, while if you would put the general practitioner in direct touch with the public health service, give him a great amount of information, call him to meetings with the public health officials and give him a scientific, a civic and also a pecuniary interest in the work, I think you would have a much greater spreading effect than by many other methods. In some of your states you have a sort of house to house visit in order to convince the citizens of the necessity of improving the health of their dwellings and their general habits. Who can do that better than the general practitioner? If you ask him to do that for every one of his patients he will tell you he has not the time to do it, that he must earn his living. If you interest him by giving him some remuneration, then, of course, his argument will fall and he will be your helper. I think the two great defects of actual medical practice are, first, that the practitioner is able in many cases to have the experts at his disposition and, second, that we have not the organization at present on the large scale that it should be.

Mr. F. L. Hoffman, Newark, N. J.: The question which has been raised by Captain Sand of the Belgian Industrial Commission is indeed a most important as well as practical one to the American people at the present time. It is quite probable that one of the unforeseen consequences of the war will be a restored Belgium, in which all matters of health and medical administration will be raised to a standard such as has heretofore been considered unattainable. The new Belgium will be confronted by the imperative necessity for the practically immediate solution of health problems which have given us such serious concern during recent years. New diseases will have been introduced in consequence of the war, not the last and least of which, malaria, may prove a future health problem of sufficient importance to demand the introduction of preventive measures, which have been found so successful in this and other countries where the disease prevails to a more or less serious degree. Belgium before the war had a reasonably satisfactory public health administration, but it is probably a foregone conclusion that with a depleted medical staff and diminished financial resources, a most rigid economy will be necessary in the medical and institutional care of the Belgian people. It is, therefore, quite readily conceivable that some plan of coordinated state health and medical administration may come into existence, under which the large majority of the people will be provided for as regards their medical and surgical needs at minimum expense. In England a similar tendency has developed in consequence of the war and urgent demands are being made for a ministry of health with its functions intelligently coordinated to the needs of the people for adequate and efficient medical and institutional treatment at minimum cost. Such a system of state medicine is, however, a question of taxation and not of insurance. The paramount duty is to eliminate at the outset all unnecessary bureaucratic organizations which have so largely become the means or methods of oppression and ruthless government control in the German empire. First and last, however, the question is one of prevention rather than of treatment and cure. It is to be hoped that Belgium will be the first nation after the war to establish a really efficient state health administration, having for its main purpose the prevention of any and all diseases, as well as physical defects and deformities, which can be dealt with rationally and effectively by the state. It would be a calamity if such a worthy purpose were to be interfered with, or perhaps partially defeated by a continued imitation of the German fallacy of compulsory insurance. The more thoroughly the details of this aspect of the question are inquired into by those qualified to do so, the more convincing the conclusion that the problem is one of efficient administration on the one hand, and of equitable taxation on the other, and neither by direction or indirection one of insurance in the accepted sense of the term.

Dr. James A. Hayne, Columbia, S. C.: In 1878 we endeavored in South Carolina to have the entire medical profession interested in public health work. We created a state board of health and that state board of health is the South Carolina Medical Association. It has about 700 members, practically every worth-while doctor in South Carolina. Our legislators at that time thought that that would certainly interest all the medical profession of the state in public health work, and it not only did that but it read into the constitution of the state these words, that the State Board of Health of South Carolina shall be the sole advisors of the citizens of the state in matters pertaining to health. It put the responsibility where it belongs, on the medical profession, and put the advice-giving authority where it belongs, with the medical profession. Of course, since that time a great many other agencies have sprung up to give advice to the people on public health that are not always confined to the medical profession. Whether they give good advice or not is a matter of a great deal of difference of opinion. In regard to state medicine the only opportunity I ever had to study that was when I was on the Isthmus of Panama where every doctor was employed by the United States government, and he was assigned to a certain district. A certain force was assigned to that district. Any visit made by the doctor was paid for by the United States government. The person he visited, if he was not an employee, signed a receipt for that visit. The money was collected out of that man's salary, and not paid to the physician who made the visit but it was paid back into the engineering fund to help the building of the canal. Now, you may say that the physician did not care whether he visited the patient or not or whether the patient got well or not, because the doctor got nothing more for it if he paid the patient ten visits than if he paid him one, so he would neglect his patients by paying only one visit. There was a check on that, however. Each district had to report to the chief sanitary officer every morning showing the health conditions in that district for the previous twenty-four hours, and if there was an increase of any disease, he was immediately called on the telephone to know why his district had gone above the normal rate. He was told that if he could not correct those conditions to ask for aid from the chief sanitary officer and help would be sent him and in that way the normal of disease or average amount of disease in his district would be kept down.

Results of the Children's Year Program in California.—In the weighing and measuring drive of the Children's Year national program in California, in June and July, between 40,000 and 50,000 record cards were distributed, and to September, 1918, 40,863 of these had been returned to the state chairman of the Children's Year Committee. These report on children of less than 6 years of age and it is said more are to be received. In a tabulated statement in the *California State Journal of Medicine* for September, 1918, Dr. Adelaide Brown, San Francisco, chairman of the committee, shows that of the total number of records received 32,167 have been analyzed. The number of children who had tonsils and adenoids requiring operation was 10,133, or 31 per cent. The total number of defects of all characters was 15,261, or 47 per cent. Of the 29,917 cards tabulated for height and weight, the number of children below normal height and weight was 8,731, or 29 per cent. The total for defective teeth was 1,678, or 6 per cent., of the 27,407 cards analyzed in that study.

Clinical Notes, Suggestions, and New Instruments

THE USE OF OXALATED AND CITRATED BLOOD FOR ROUTINE CLASS STUDY*

FREDERICK HOWARD FALLS, M.S., M.D., CHICAGO

The problem of presenting to students various pathologic blood specimens in connection with clinical laboratory work is often one of considerable difficulty. This is especially true of colleges which have a small teaching hospital or none at all, or which are far removed from the large medical centers. Ideally, of course, each student should come in contact with the various diseases studied and observe the blood picture in connection with the other symptoms of the disease. Even in the more fortunately located institutions with attached teaching hospitals, it is sometimes impossible to bring the students in contact with the patients having blood diseases, because of the size of the classes and because of the inconvenience afforded to patients who may be severely sick at the time of the examination.

These objections have been met in the past by obtaining blood smears in the usual way and passing them out stained or unstained to the student, or by means of loan collections owned and cared for by the department. Obviously a complete blood examination including red and white counts and hemoglobin estimation is impossible under these conditions. Besides, the student is deprived of the opportunity to make smears personally, which is an important technical point in routine blood examination.

Failing the ideal bedside study of the blood picture, an approximation may be sought by furnishing the blood to the student for examination in practically the same condition that it exists in the patient so that he can make his various smears and dilutions at some distance from the case. This can be very satisfactorily met by the following simple procedure: A few crystals of sodium citrate or sodium oxalate are placed in a 10 c.c. Lüer syringe, and blood is withdrawn from the median basilic vein in the usual manner. On entering the barrel of the syringe the blood plasma dissolves the citrate, and this effectually prevents the clotting of the blood. The blood is then blown out into sterile tubes and kept in a cool place until ready for use. Blood may be kept for hours by this method without undergoing any appreciable change either in its cell count or in the staining reactions of the individual cells.

The blood is then studied in the routine way that the student has used in the study of normal blood, and such details as concern symptoms, the diagnostic significance of the blood picture or any others which in the opinion of the instructor will add to the value of the exercise are added.

By this method I have studied specimens from cases of pernicious anemia, leukemia, lymphatic and myelogenous, malaria, trichinosis, secondary anemia, and cases with varying grades of leukocytosis.

Red and white counts and hemoglobin estimations have been made both before and after treating the blood with oxalate. Differential counts were made on stained smears from oxalated or citrated blood, and no differences in the staining properties could be detected. One point is to be noted in making red and white counts: On standing even for a few minutes, there is a marked tendency for the corpuscles to settle out of the citrated plasma. If then a blood count pipet is introduced into the tube and blood from the upper layer is taken, the count will be found to be less than that of the uncitrated blood of the same patient. If, on the other hand, the pipet is introduced to the bottom of the tube, the blood count will be found to be above normal. It is necessary, therefore, to shake up the citrated blood thoroughly, immediately before making a red or white blood count, in order to get a uniform admixture of cells and to estimate the true number per cubic millimeter.

It is considered advisable to use the crystals rather than solutions of sodium oxalate or citrate in order to minimize the changes in the quantitative determinations due to dilution of the sample, especially in making the red and white counts.

CONCLUSIONS

1. The use of oxalated or citrated blood for routine class study is practical and desirable.
2. No differences in staining reactions or in making red or white blood counts could be detected when using oxalated or citrated blood as compared with normal fresh blood.
3. These conclusions hold for the pathologic blood studied as well as for normal blood.

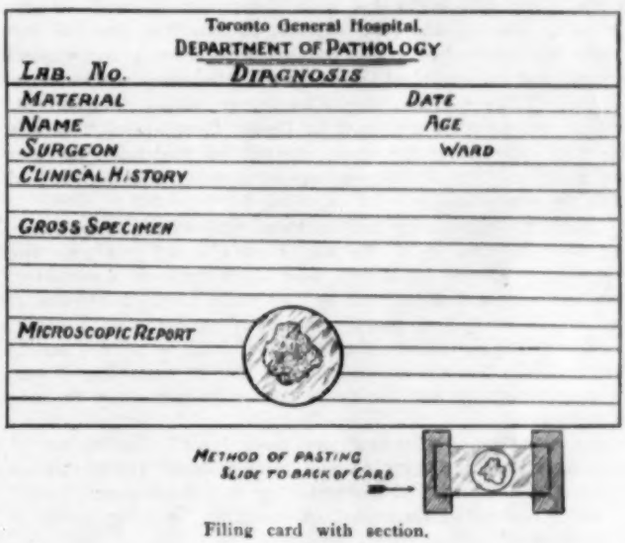
* From the Departments of Pathology and Bacteriology and of Obstetrics, University of Illinois College of Medicine.

A CONVENIENT METHOD FOR FILING SURGICAL SECTIONS*

W. L. ROBINSON, B.A., M.B., TORONTO

We have experienced considerable difficulty in keeping our surgical sections properly filed in such manner that they might at all times be readily accessible, and at the same time have proper notes filed with them which could be indexed and cross-indexed.

The filing of the sections in one set of drawers and the cards, with notes on these sections, in other drawers is not only an inconvenience but also involves unnecessary work. To obviate this we have mounted the section on the back of the filing card, in which a hole has been punched, to enable one to examine the section under the microscope while it is still attached to the card. An ordinary filing card, 4 by 6 inches, is used, and a hole seven-eighths inch in diameter is made with a steel punch in the center of the lower margin. The section is then pasted to the back of the card with coverslip side toward, and just under, the hole with two short pieces of passe-partout seven-eighths inch wide. This will hold the section firmly to the card, and it can be handled freely without danger of detaching the section.



Filing card with section.

MODE OF PROCEDURE

One of these cards is filled out and the specimen given a serial number just as soon as it is brought to the laboratory. A synopsis of the clinical history is written and a gross description made. When the section is through, the technician pastes it on the back of this card, using blank cards for any extra sections there might be. They are then brought in for histologic description and diagnosis. A complete report is made out from this, in triplicate, by the stenographer. The cards with sections attached are then filed, according to serial number, in ordinary filing cabinets. One copy of the report is then filed alphabetically in our laboratory, with cross-index

* From the Department of Pathology, Toronto General Hospital.

to the section. Another copy is sent to the ward and attached to the patient's chart; the third copy is sent to the attending surgeon.

We have been using this method for filing sections for some time and have found it entirely satisfactory.

REPORT OF A CASE OF FOREIGN BODY IN LEFT MAIN BRONCHUS FOR TEN YEARS

Thomas Hubbard, M.D., Toledo, Ohio

L. W. aspirated an old, somewhat irregular three-quarter inch staple when she was 9 years of age. At that time she was recovering from measles. She developed bronchopneumonia with subsequent abscesses and occasional hemorrhages. She was not able to attend school on account of feebleness and constant coughing of foul-smelling sputum. For ten years she passed a wretched existence.

For some unaccountable reason, no roentgen examination was made by any of the six physicians consulted during this ten-year period, and the patient was subjected to all kinds of consumption remedies in spite of the oft-told story of the accident. The family moved to Toledo, and at the Thalian Dispensary, Dr. Rabenoyich became suspicious that she was not tuberculous. Roentgenoscopy by Mr. Dachtler revealed the cause of the lung trouble. The staple was clearly outlined in the lower left bronchus, with the points upward. There was very little of the lung capable of function, and the left thorax was shrunken. The patient was anemic and underweight, and had clubbed fingers and subnormal temperature.

I treated her for two weeks by intratracheal injections of 2 per cent. menthol guaiacol in liquid petrolatum, with the object of evacuating the cavity containing foul mucopurulent accumulation. This treatment was of considerable benefit and made operation easier.

June 4, a preliminary tracheotomy under local anesthesia was done by Dr. Jacobson, and then I could evacuate the bronchial reservoir by direct aspiration through a catheter. Removal was not attempted at that time, as I considered it inadvisable to follow morphin-procain narcosis with ether. Even after cocainization, the bronchial tract was very sensitive, and in a patient so long habituated to coughing it was not possible to secure the quiet condition necessary to safe extraction.

Operation was performed two days later. Aspiration of mucopus was done prior to and during ether anesthesia to prevent the flooding of the sound lung—a not infrequent cause of death under anesthesia in patients having such a bronchorrhea.[1]

Offensive pus and blood—half a pint or more, quite enough to flood the sound lung—was aspirated as anesthetization progressed, and then only did it seem safe to push narcosis in the supine posture to the point at which one could work in a quiet bronchus. Dr. Price skilfully pushed anesthesia to the limit of safety, and I was able to pass the tube to the region of the foreign body without the usual amount of coughing. The bronchus was strictured by granulations, and I could get only the baby-sized forceps through. I locked on the lower point of the staple, and in withdrawing it pulled out the granulation mass above it and that ingrown with the iron oxid and pyrites. It was extracted apparently intact, but later the patient coughed out one piece of the iron compound as large as a pea. The mass was cokelike, friable, and measured 1 cm. lateral by 0.5 cm. anteroposterior by 2 cm. in length. The outlines of the wire were visible in spots. I have no doubt that it would all crumble into fragments if a crushing forceps grasped it in the center with only the ingrown granulation tissue to hold it together.

The points were thinned out and flexible. I mention this as the roentgenogram gave the impression that we had the problem of preventing the points from catching on extraction, and I planned to attempt turning if that happened. But in the case of an old staple, with the galvanized coating gone, melted away in rust and pyrites (ferric sulphid), and the points eaten way, properly grasped at the open end it was simply a matter of coaxing the mass out intact and without losing fragments in the sound bronchus.

The sputum gradually became odorless, and in a month the patient was coughing only once a day. Six weeks later there was very little expectoration; she had gained 6 pounds in weight, had only an inconspicuous scar, and the left lung was functionating fairly well, considering the area of lung tissue actually destroyed. There is no bronchial stenosis in evidence as yet.

COMMENT

Tracheotomy was indicated in this case to make easier the evacuation of the mucopus in the lung whereby the field was cleared and the foreign body properly grasped, and also as a protection to the operator. There was danger of losing the foreign body, or part of it, at the laryngeal isthmus, in which case it would probably have dropped back into the sound lung.

Perfect facilities for aspiration made ether narcosis safe, and in consideration of probable complications in extraction, such as necessity for turning, or a fibrous stricture of the bronchus, absence of tumultous coughing was a factor in safety.

Without tracheotomy and direct aspiration of the accumulation of mucopus, general anesthesia would not have been safe, and I should add that by preliminary tracheotomy and repeated aspirations the anesthesia was made easy and the time very short.

The suspension method was considered; but here, again, the difficulty of preventing flooding of the sound lung made this impracticable.

A CASE OF TRAUMATIC RUPTURE OF THE KIDNEY WITH DELAYED HEMATURIA

Robert W. Angevine, B.S., M.D., Rochester, N. Y.
First Lieutenant, M. R. C., U. S. Army.

A case of traumatic kidney rupture, showing almost immediate abdominal signs but delayed urinary findings, was recently observed by the surgical service of the Rochester General Hospital.

A girl, aged 8 years, of Italian birth, was carried to the children's pavilion of the hospital, complaining of pain in the back. According to the history, the child had stepped into an open coal-hole and had fallen 12 feet into a cellar, striking on a dirt floor. The girl was unable to tell of the details as to whether or not she struck a protruding ledge or post. The history further states that she was stunned and had vomited once. She managed to walk home after the accident, but the mother noted that she became listless and complained more and more of pain in the lower part of the back.

On admission to the ward, eight hours after the fall, the child was restless and evidently in severe pain. There was no area of ecchymosis over the iliac crest on either side, but deep palpation in the kidney regions elicited tenderness only on the right side. There was no rigidity in the costovertebral region. Examination of the abdomen revealed a slight degree of distention, but there was no spasm or rigidity of the abdominal musculature. Flatness to percussion was evident in both flanks, and in the lower flank when the patient was rolled on either side. An indefinite fluid wave could be made out.

The leukocyte count gave a figure of 12,000. There were 4,400,000 red cells per cubic millimeter. The urinary findings were negative. No blood was noted in a microscopic examination of an apparently normal stool. The systolic blood pressure was taken as 105, and the diastolic as 60. Temperature was recorded as 101.4; pulse 120, and respirations 24.

At 9 o'clock in the evening the child was noted as being more restless than earlier in the day, and the pallor of the skin and mucous membranes and rising pulse suggested increase in hemorrhage. The pulse was taken as 140

1. It is necessary to have an aspiration apparatus that will give from 5 to 10 pounds negative pressure, as mucopus is liable to clog a tube. I prefer the suction syringe with wash bottle. Some negative pressure air gages are standardized to centimeters of mercury and not pounds, as often interpreted. For instance, such a gage reads "fifteen." That equals only 6 inches of mercury or 3 pounds pressure. A good aspiration syringe of 8 ounce capacity, leather washers lubricated by neat's foot oil (never by a hydrocarbon oil, as that hardens leather) and a pint wash bottle make a perfect aspirating outfit for any throat or lung work.

Laparotomy was decided on. At 10 p. m. Dr. Joseph W. McGill operated under ether anesthesia. A 4-inch incision was made outside of the right rectus muscle, liver or intestinal injury as well as perirenal trouble being suspected. Free blood, containing many large clots, was present in the abdominal cavity. Examination of the bladder, intestines and liver disclosed nothing. The posterior peritoneum of the right side was raised by the pressure of the blood and was loosely applied to the parietes. In the region of the cecum the posterior peritoneum was bulging over a large hematoma. Above this point there was a tear in the peritoneum.

After palpation of both kidneys, and swabbing out the major portion of the blood from the general abdominal cavity, the peritoneum of the right posterior wall was stitched in place and the abdomen closed, one drain being directed through a stab incision in the right lower quadrant to the retroperitoneal area, and the peritoneum sutured around it. The pelvis also was drained.

After operation the temperature rose slightly, reaching 102.6 on the following day. The urinary findings were still negative. On the sixth day after operation, after both drain tubes had been withdrawn, the pathologic report on the urine indicated some microscopic blood present in the sample. Macroscopic blood was noted the following day. The amount of blood increased daily until, on the tenth day after operation, the urinary specimen showed a large proportion of blood. The blood content then gradually decreased until the specimen was reported as negative on the twenty-second day. Hexamethylenamin was given in 3-grain doses on the first day of urinary signs, and was continued until the report was returned negative. The hematuria was not considered to warrant operation, as it was assumed that the contusion or laceration would heal spontaneously. A subsequent true nephritis was not considered probable in the prognosis.

The child coughed a little on entrance to the hospital, and the suggestion was made that this might be attributed to diaphragmatic irritation. This cough disappeared without special treatment during the stay in the hospital. The child sat up in a chair on the twenty-fourth day; was pushing herself around the ward in a wheel chair on the twenty-sixth day, and was up and around on the twenty-eighth day after operation. Since discharge the child has been doing well and no complications have been reported.

ACUTE POISONING BY FIVE GRAINS OF ACETYLSALICYLIC ACID—"ASPIRIN"

EDMUND P. SHELBY, M.D., NEW YORK
Attending Physician, City Hospital

The following report shows that some persons are peculiarly susceptible to the effect of acetylsalicylic acid—"aspirin":

Miss A., a strong, vigorous woman, aged 32, weighing 140 pounds, consulted me about indefinite pains in the back and chest which followed a slight sore throat. I prescribed aspirin in 5-grain capsules. The first capsule, of the Bayer brand of acetylsalicylic acid, was taken at 12:15. Forty-five minutes later the patient felt an itching of the scalp, swelling of the hands, and white blotches appeared over the face and body. In a few minutes the eyes were swollen and closed and violent irritation of the larynx set in.

I was hastily summoned and found the patient unable to speak and with marked interference with breathing. The face was hardly recognizable, and the obstruction of the larynx was very alarming. The pulse was rapid and the breathing spasmodic. The question of tracheotomy for the relief of the laryngeal obstruction was considered.

Before my arrival the patient had taken half an ounce of Epsom salt. This soon brought on nausea and a small amount of liquid was vomited, after which the patient fainted. On her return to consciousness the rash began to fade, the breathing became less labored, and the swelling of the eyes subsided. By 3 o'clock, two hours and forty minutes from the time she had taken the acetylsalicylic acid, the patient was fairly comfortable, could open her eyes and speak. At that time the temperature was 98.6, respiration 20, pulse 92. A rapid return to normal followed. The next day no ill effects were apparent.

That these symptoms were caused by the acetylsalicylic acid there can be no doubt, as the patient had not partaken of food or of other medicine since the night before. Unusual susceptibility to the action of salicylates has often been noted, but I do not recall a case in which so small a dose has produced such marked symptoms.

116 West Seventy-Fourth Street.

AN ASPIRATOR FOR PARACENTESIS

H. C. STEVENS, M.D., DUNNING, ILL.

Many forms of apparatus have been devised to create a vacuum sufficient to withdraw fluid from the pleural cavities. The Pétain system is effective when the parts are new. It has the disadvantage characteristic of all complicated mechanisms of easily getting out of order. The two chief difficulties, aside from expense, which we have experienced have been (1) in the valves of the pump, which have failed to close properly, and (2) in leakage about the hard rubber stopper of the bottle. The latter trouble is probably due to changes in the rubber incident to age. To obviate these difficulties, we have devised a simple apparatus which produces suction by means of a siphon. Any hospital possessing two 2-liter bottles, two two-way rubber stoppers, some glass tubing and rubber tubing can assemble an effective aspirator in a very short time. The construction is shown in the drawing. A 2-liter bottle, provided with a two-way rubber stopper, is filled with water and serves as the siphon. In the illustration, *D*, with the tube, *E*, performs this function. A similar bottle, *B*, is sterilized by boiling, together with the tubes *A* and *C*. Bottle *B* is used to collect the effusion. Rubber tubing with an inside diameter of 4 mm. is used. A blunt trocar with a sharp obturator, or a smaller steel needle may be used. A "window" consisting of 2 cm. of glass tubing is inserted into tube *A*, a short distance from the needle. Tube *E* is filled with water and clamped, or allowed to kink from its own weight, at the point where it is connected with the glass tube. If the latter method is followed, simply raising tube *E* will cause the siphon to run; lowering it will stop it. In performing paracentesis, *A*, *B*, *C* and the needle are sterilized by boiling. The siphon is started and then stopped. Puncture is made in the manner, and at the site, preferred by the operator. An assistant starts the siphon as soon as the needle enters the pleural cavity.

Aspirator for paracentesis.

Chicago State Hospital.

The Human Thought Mechanism.—The intellect cannot examine any fact of matter or energy directly. The telephone mechanism of the senses is always in between. Like the line officer in the war, we live in a dugout, the dark dugout of the cranial cavity. Our news comes in over the wires or afferent nerves. Our news is never complete, for our sense organs are not adapted to all the forces of nature. Our news is often faulty because the sense organs or the transmission is imperfect. Often we fail to get messages because our receiving operators are indolent, or doing other things. Moreover, if we get the news straight, we may not use it right; that is, make the right conclusion or judgment.—E. P. Lyon, *Texas State Journal of Medicine.*

Military Medicine and Surgery

MEDICAL STUDIES IN AVIATION*

[NOTE.—This series of papers represents the results of investigations made at the Medical Research Laboratory, Air Service, Mineola, L. I. It concerns particularly the protection of aviators against the effects of high altitudes, low barometric pressure and deficiency of oxygen.—Ed.]

I. ORGANIZATION AND OBJECTS OF THE MEDICAL RESEARCH BOARD, AIR SERVICE, U. S. ARMY†

YANDELL HENDERSON, PH.D. (NEW HAVEN, CONN.)
AND
E. G. SEIBERT, M.D. (WASHINGTON, D. C.)
Lieutenant-Colonel, M. C., N. A.
MINEOLA, L. I., N. Y.

The Medical Research Board was organized early in the autumn of 1917, "to investigate all conditions which affect the efficiency of pilots; to institute and carry out at flying schools or elsewhere such experiments and tests as will determine the ability of pilots to fly in high altitudes; to carry out experiments to provide suitable apparatus for the supply of oxygen to pilots in high altitudes; to act as a standing medical board for the consideration of all matters relating to the physical fitness of pilots." The equipment controlled by the board consists of a large and constantly expanding laboratory for research and teaching at one of the principal eastern flying fields, and of smaller branch laboratories for examining purposes already at work or being organized at twenty other flying fields and ground schools. In the main laboratory, departments have been organized in physiology, cardiovascular functions, psychology, ophthalmology, otology and psychiatry and neurology.

The general purpose of the organization is the study of the effects on the aviator of the peculiar conditions involved in flying. Among these the effect of altitude, that is, of altered barometric pressure, has presented itself as the one of most immediate importance. This series of papers will present a general oversight of the results on altitude thus far accomplished.

In this field four problems demand solution:

1. The cause and nature of the failure, physiologic or psychologic, or both, on the part of the pilot which frequently precedes a fall.

2. The development of a method for determining the maximum altitude to which each individual pilot can ascend without danger of such failure.

3. The development of forms of physical training for increasing the resistance of the pilot to the ill effects of altitude, and for maintaining him in a state, not of acclimatization to great altitude like the mountaineer, but rather in the perfect physical condition of the athlete.

4. A deeper knowledge of the nature of air staleness —a condition closely similar to athletic "overtraining," and to the so-called "irritable heart" or neurasthenia of the overstrained soldier.

We are now able to report an approximate solution of the first problem and a complete solution of the second. The third and fourth remain for further investigation from the starting point defined by these studies.

The results of previous investigations, from those of Paul Bert down to those of the Pike's Peak Expedition, had demonstrated clearly that the essential element in the effects of low barometric pressure, that is, great altitudes, on men consists in the reduced partial pressure of oxygen. Mountain sickness had been shown to be fundamentally due, not to the merely mechanical effects of decreased air pressure in the ears and on the blood vessels, but to oxygen deficiency. It was a fair presumption, therefore, from which to start investigation that the same thing would hold true in general of the functional disturbances of the aviator, although some modification of the symptoms might arise from the differences between mountaineering and aviation. These differences evidently consist in the aviator's more rapid ascent and descent, in the greater altitudes reached, and in the briefer period for which he remains at the altitude.

Previous investigations, notably those of the Pike's Peak Expedition, were directed largely to discovering the nature of acclimatization to altitudes. The length of time during which the aviator remains at altitudes is, however, too brief for any appreciable degree of acclimatization to be developed. On the contrary, day by day the brief but repeated strain of oxygen deficiency—a strain much like that of athletic overexertion —produces a cumulative ill effect on the aviator of the higher levels, until, if his condition is not recognized and his flying stopped, he one day loses consciousness at a great height, and falls. For the aviator is essentially an unacclimatized man, and must depend on the capacities of the healthy body adjusted only to the level of his hangar and his quarters. Our investigations have dealt, therefore, not with acclimatization, but with a hitherto largely neglected problem, namely, the organism's immediate compensatory reactions to oxygen deficiency.

In another class of accidents and near-accidents, the pilot's failure occurs near the end of a rapid descent. Often he has no recollection of how the crash occurred; he had lost consciousness, was asleep. This is highly significant; for this is a state which is induced by an ample supply of oxygen, or fresh air at full pressure, after a period of deprivation. As yet undescribed in the literature, so far as we are aware, and largely unexplained, this interval of unconsciousness, or collapse, or sometimes of excitement and loss of balance physical and mental of alcoholic type, is nevertheless a phenomenon often met by students of the low oxygen problem. It occurs in a wide variety of conditions: in miners escaping from "after-damp," in city firemen after coming out of smoke, in the older types of submarines on opening the hatches after submergence, in persons who are given oxygen after overexertion on a

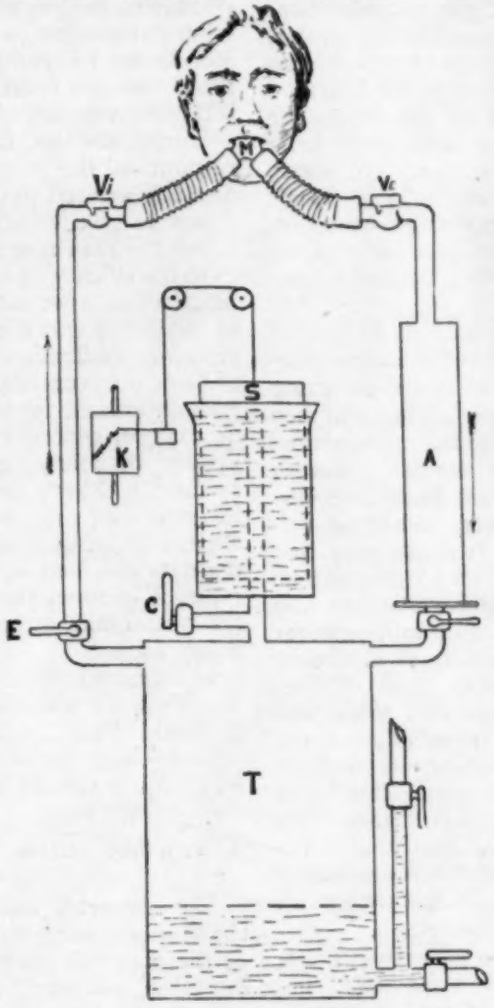
* Edited by Yandell Henderson, chairman, Medical Research Board.
† From the Medical Research Laboratory, Air Service, Mineola, L. I.

mountain, and after low oxygen experiments in the laboratory. But in none of these conditions are the consequences so serious as for the aviator, when, after remaining for a time at a height greater than he can safely withstand, he makes a rapid descent to denser air. Then, just as he is about to land and needs all his faculties at their best, he develops this oxygen intoxication as the rebound from oxygen deficiency.

Laboratory experience had shown that to produce the acute effects of oxygen deficiency it is not necessary to climb a mountain or to go up in a plane, or even to be exposed to low barometric pressure. The result is easily accomplished at sea level by breathing into an apparatus consisting of a spirometer and a canister containing alkali. The exhaled carbon dioxid is absorbed by the alkali, while the oxygen is gradually reduced by the continual rebreathing. An apparatus of this sort, the so-called rebreathing apparatus, has been in use for some years past in the physiologic laboratory at the Yale Medical School as a simple and ready method of studying what are virtually the effects of altitude.

Accordingly, as a preliminary to our work, the first step taken by the physiologic division was to perfect the rebreathing apparatus for routine use. Then followed several months of investigation to determine which of the autonomic functions of the body, e. g., the pulse and the arterial pressure, are most affected by low oxygen. Simultaneously the psychologic and ophthalmologic divisions perfected the apparatus and technic for observation, measurement, and record of motor and sensory disturbances.

Later, a steel chamber large enough to hold six or eight men at once and an air pump were installed, so that observations could be made under any desired reduction of air pressure. The effects observed at pressures equivalent to those attained in actual flying are described in the papers that follow. One experiment, however, deserves mention here. Two men were exposed to a minimum pressure equivalent to an altitude of 35,000 feet (barometer, 180 mm. of mercury). They were supplied with an oxygen apparatus, for air of this tenuity is incompatible with consciousness or even life, and they experienced no ill effects. In a word, these and similar observations have demonstrated that (1) the effects of altitude and low barometric pressure arise from deficiency of oxygen, and (2) in all essential features the conditions obtained by means of the rebreathing apparatus are the physiologic equivalents of low pressure.



The rebreathing apparatus employed in all routine tests of the aviator's ability to withstand low oxygen. It consists of a tank, *T*, of about 120 liters capacity. The volume of air is determined by the amount of water that is run into it. The man under examination continually rebreathes the air of the tank (a clip is placed on his nose) through the inspiratory and expiratory valves, *Vi* and *Ve*. The oxygen is thus consumed and reduced. The exhaled carbon dioxid is taken up by sodium hydroxid in the absorber, *A*. The movements of respiration are recorded by the spirometer, *S*, connected to a smoked drum, *K*. As the oxygen is consumed and the air volume is thus reduced, the spirometer falls and the graphic record on the smoked drum rises. At the end of the test a sample of air is drawn from the tank and analyzed as a confirmation of the oxygen consumption and of the oxygen percentages (that is, altitudes) indicated by the graphic record.

It had come to be a generally accepted doctrine that deficiency of oxygen for short periods of time and above a certain limit, say 13 or 14 per cent. of an atmosphere, induces practically no recognizable effects. The subject of an experiment in which the oxygen is progressively reduced is frequently entirely unaware of any alteration in his own condition down to the point at which consciousness is abolished. Even after restoration he often refuses to believe that he has been through the glassy-eyed and wholly irresponsive condition from which the observer has revived him with fresh air.

Nevertheless, so far from moderate deficiency of oxygen being without effect, our observations have revealed the fact that in normal men characteristic alterations of function begin even with a slight lowering of the oxygen tension. Thus it appears that in flying the normal person begins to react almost from the moment that he leaves the ground. These reactions are found to be of a compensatory nature: the resistance of the healthy subject, the fact that up to a certain altitude he feels and shows no immediate ill effects, depends on the ability of his body automatically to effect alterations of breathing, pulse, and psychologic forces such that the net result is a practically normal individual. For all persons there are limits beyond which the body cannot compensate. In this respect there are the widest individual variations, forming a scale from the man with a "weak heart," who can withstand scarcely any reduction of oxygen, up to the man whose respiration and circulation are of such adaptability and power that he can go to 25,000 feet, and yet for a time be virtually normal.

The strain imposed by altitude is closely similar to that induced by extreme physical exertion. In both conditions, oxygen deficiency occurs; but at altitudes and in an aeroplane the effects are the more subtle and dangerous because of the lack of the stimulation to breathing and other functions that the increased carbon dioxid production affords during muscular exertion. For the same reason low oxygen, used with discretion in the low pressure chamber or the rebreathing apparatus, affords a condition clear and simple above any of the conventional forms of physical exercise sometimes employed in internal medicine as aids to examination of the heart.

The resistance and compensatory power of the normal man against low oxygen have been found to be practically the same qualities as "condition" or "training" in the athlete; and lack of compensatory power equivalent to being "out of training." In its more extreme forms it is identical with a "weak heart." From this it follows in theory, as the cardiovascular division in the Research Laboratory has in fact discovered, that the methods based on the rebreathing apparatus are not only applicable for measuring "fitness" and "staleness" in the aviator, but also offer hope for development into that long sought and greatly needed aid to cardiovascular diagnosis: a general test and measure of the "functional power of the heart."

It will be evident, however, that by the expression "functional power of the heart" we mean much more than merely the strength of that organ. We mean, rather, the totality of the processes of the body's gaseous exchanges with its atmospheric environment. These processes are the very essence of life. Low oxygen tests are thus fundamentally measurements of vitality.

In the following papers is contained a general description and a proximate analysis of the compensatory reactions and the forms of overstrain occurring under brief periods of partial oxygen deficiency in men who, having passed the ordinary medical examination, would generally be considered as normal. Among them our methods have revealed a considerable percentage unsuited to fly except at very moderate altitudes, and some unfit to fly at all. It is our hope that the institution of routine examinations by this technic will result in greatly reducing the number of pilots who may lose consciousness in the air and fall, whether because of inherent unfitness or because of otherwise unrecognized air staleness.

During the inception of our work and while our laboratory was being erected, we were allowed the privilege of laboratory space and facilities in the War Gas Experimental Laboratory, then under the U. S. Bureau of Mines. In this and in other matters this bureau has rendered us invaluable assistance. On behalf of the Medical Research Board it is a pleasant duty to express to Director Van H. Manning an acknowledgment of our debt.

New Sources of Quinin.—The extensive antimalarial campaign in India and the increased demand for the drug on account of the war have emphasized the necessity for finding new sources of quinin to keep up the world's supply. The *Indian Medical Gazette* for July describes the situation with reference to quinin in India. There are in that country a number of cinchona plantations in certain districts, under government supervision, which supply a considerable amount of quinin for the use of the government where quinin is a government monopoly. That country, however, like the rest of the world, is dependent for the greater portion of its quinin supply on Dutch Java, where quinin is also a government monopoly. The first plantations were started in India about 1864. On account of the largely increased demand for the drug, in 1900 a new plantation was begun containing about 9,000 acres. This now supplies bark for one of the large factories in India. In the past year the government, with the idea of still further increasing the cultivation of cinchona bark, directed a survey throughout India and Burma to locate cinchona plantations on a large scale. An area which seems to be suitable has been found near the Siam frontier covering about 400 square miles much of which, it is expected, will prove suitable for the successful growth of cinchona trees. The work of clearing and planting this territory will be begun as soon as possible.

II. PHYSIOLOGIC OBSERVATIONS AND METHODS *

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Major, S. C., N. A.
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In the Medical Research Laboratory of the Air Service the ability of the aviator to respond to a decreasing oxygen supply is tested by an experiment of from twenty-five to thirty minutes' duration with the Henderson rebreathing apparatus. As the oxygen in the air inhaled from the apparatus is reduced, the man is thereby virtually elevated to a corresponding altitude.

During the test, the rate and volume per minute of respiration, the pulse frequency, and the systolic and diastolic arterial pressures are studied and have been found to give valuable evidence as to the altitude at which the man first responds to oxygen deficiency and as to the efficacy of his compensatory reactions. These reactions consist chiefly in an increased ventilation of the lungs and a more rapid blood flow. In a few men a concentration of the blood also occurs.

Some men compensate so easily and so well that they endure, at least for brief periods, as low as 6 per cent. of oxygen, corresponding to 31,000 feet: an altitude greater than any heavier than air machine has yet reached. Others fail to compensate, or compensate inadequately, and therefore cannot endure even the slight oxygen deficiency of moderate altitudes. From the data obtained in the test on the rebreathing apparatus, it becomes possible to determine approximately the maximum altitude to which the aviator may safely ascend.

If the man is even slightly below the best of physical condition, the altitude to which he is safe is distinctly reduced. A cold, indigestion, late hours, or worry may reduce his resistance temporarily by many thousand feet. More serious indisposition affects him to a corresponding extent.

THE BREATHING UNDER PROGRESSIVE DECREASE OF OXYGEN

The character of the breathing is important. In shallow breathing, only a comparatively small amount of the fresh air gets past the so-called dead space—the nose, pharynx, trachea and bronchi—to mingle with the air in contact with the blood vessels of the lungs. The deeper the breathing the greater will be the amount of fresh air that reaches the alveoli of the lungs, and hence the greater will be the supply of oxygen for the body tissues.

As the percentage of oxygen gradually decreases during a rebreathing test, there occurs a marked respiratory response. In a few men this increase in the lung ventilation begins with the first decrease in the oxygen percentage of the air breathed, and is a gradual proportional increase in inverse ration with the reduction in oxygen. More than 50 per cent. of the men examined, however, gave the first respiratory response between 16 and 14 per cent. of oxygen. Twenty-five per cent. responded first at a lower oxygen tension, while a small number gave no response. The increase in lung ventilation is for the higher percentages only slight, but it usually becomes more pronounced when the available oxygen has been decreased to between 12.5 and 9 per cent.

* From the Medical Research Laboratory, Air Service, Mineola, L. I.

The rate of breathing for many men remains unchanged throughout the rebreathing test. The majority, however, show an increase of from two to four breaths per minute at between 8 and 6 per cent. of oxygen. A few of the men examined, showed by other tests to be physically somewhat stale, increased the frequency of breathing enormously.

The increase of volume per minute in the breathing during a rebreathing test differs with individuals. At percentages of oxygen between 8 and 6, the majority show an increase of 5.5 liters over the volume breathed at the beginning of the experiment, when on the average it is about 8.5 liters per minute. This increase gives for the average man a total volume of breathing per minute of approximately 14 liters at oxygen tensions corresponding to an altitude of 25,000 feet. The total per minute volume of air breathed has, in exceptional cases, been as great as 26 and 37 liters of air at oxygen tensions corresponding to from 25,000 to 28,000 feet.

It is the depth of breathing that ordinarily is increased by low oxygen The vast majority of subjects show an increase in depth of breathing of from 20 to 128 per cent. when under from 8.5 to 6 per cent. of oxygen. The volume of each breath in these men is found to range between 600 and 1,250 c.c., while for the same subjects when breathing air of normal oxygen content it is between 360 and 630 c.c.

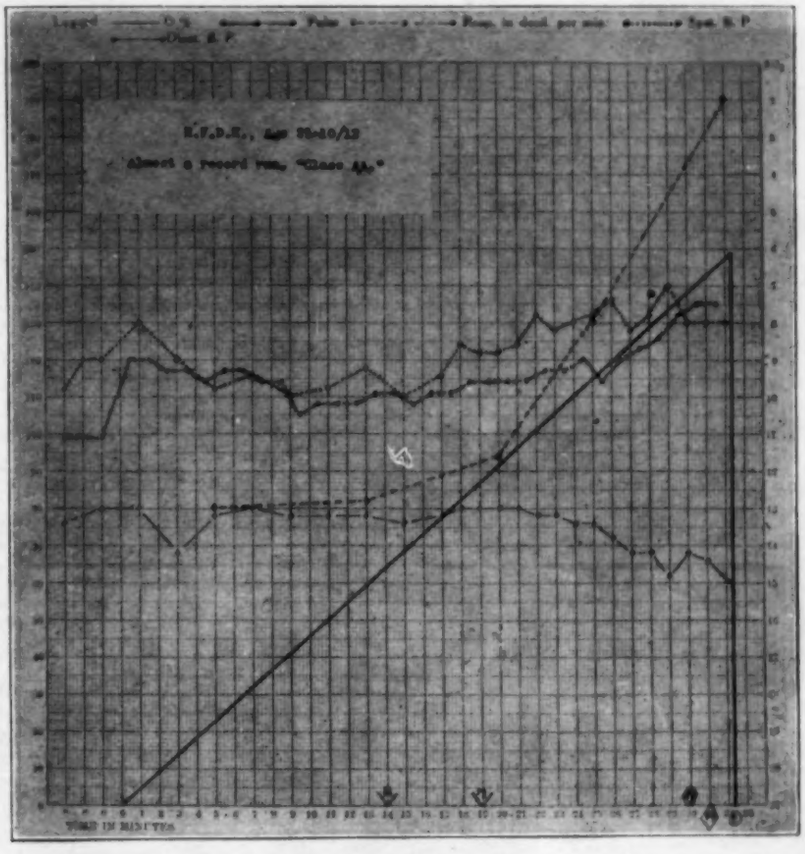

Chart 1.—Results obtained in the examination of an extra good man. The symbols at the bottom of the chart indicate his psychologic condition.

A good respiratory reaction to the gradual decrease in the oxygen of a rebreathing test is manifest in a slight increase in the depth of breathing, which begins at 16 or 15 per cent. of oxygen and continues progressively to increase slightly and gradually until from 12.5 to 9 per cent. of oxygen is reached. From these percentages down to 8.5 and 6 per cent. of oxygen, the total volume per minute of breathing increases much more rapidly; and the frequency of breathing may also increase from two to five breaths per minute. A total per minute increase of at least 5.5 liters should occur at the lower percentages of oxygen.

When the volume per minute of the breathing fails to increase as the amount of oxygen inhaled decreases, or when it increases only slightly, 1 or 2 liters, the lung ventilation is insufficient, and the subject is found unable to tolerate as low a tension of oxygen as the man whose breathing gradually deepens as the available oxygen decreases. Only a few men have failed to show a respiratory response to low oxygen, and none of these have tolerated well even such oxygen tensions as from 10 to 9 per cent. An occasional subject has been examined whose breathing responded well at first, but who later, when the percentage of oxygen was low, suddenly began to breathe less. When this happened, fainting or unconsciousness quickly followed.

THE HEART RATE UNDER DECREASING OXYGEN SUPPLY

In the active tissues the oxygen tension is always low. The higher the oxygen pressure in the blood, the greater therefore will be the amount of oxygen passing from the blood of the capillaries into the tissues. The dissociation of oxygen from the hemoglobin occurs with great rapidity and is most rapid when the differences in pressure are greatest. (This is not dependent on blood pressure.) It follows, therefore, that when the blood flows more rapidly through the capillaries of a tissue, more oxygen will be made available than if it flows slowly. At high altitudes, or under low oxygen, the blood, at first at least, is less saturated with oxygen than at low altitudes. Therefore, if the blood contains less oxygen, an increase in the rate of blood flow through the capillaries would be a means of providing the tissues with the oxygen demanded for their activity.

An increased rate of the blood flow has been demonstrated in men living at high altitudes and is, undoubtedly, one of the first of the adaptive or compensatory changes occurring in the rapid ascents made by the aviator.

Circulatory observations made on Pike's Peak (14,110 feet) indicate that the increase in the rate of blood flow is largely the result of a greater frequency of heart beat. A study of the pulse rate during exposure to low oxygen should, therefore, give a definite indication of the sensitiveness of the organism. We have found the pulse rate to be a trustworthy indicator of oxygen want, provided care is taken at the beginning of a rebreathing experiment to have the subject calm and quiet.

Throughout the rebreathing test the candidate's pulse rate is counted and the systolic and diastolic blood pressures are determined. The rate of heart beat has been found to accelerate in a few men at 17.5 per cent. of oxygen (5,000 feet). In one group of seventy men the accelerations began as follows:

Between 7,000 and 8,000 feet—from 16 to 15.5 per cent. of oxygen—1 per cent. began to react.

Between 8,000 and 9,000 feet—from 15.5 to 14.9 per cent. of oxygen—12 per cent.

Between 9,000 and 10,000 feet—from 14.9 to 14.2 per cent. of oxygen—20.

Between 10,000 and 11,000 feet—from 14.2 to 13.7 per cent. of oxygen—14.

Between 11,000 and 12,000 feet—from 13.7 to 13.2 per cent. of oxygen—23.

Between 12,000 and 13,000 feet—from 13.2 to 12.7 per cent. of oxygen—20.

Between 13,000 and 14,000 feet—from 12.7 to 12.2 per cent. of oxygen—6.

The increase in frequency of heart beat is at first slight, only from one to three beats; but as the oxygen percentage decreases, a greater increase in rate is likely to occur with each decrement in oxygen. A very marked acceleration usually occurs when the oxygen has fallen to between 13 and 9 per cent. Some men at first react with a good acceleration in rate, but soon reach a rate beyond which there is no further response, even though the oxygen percentage continues to be lowered. In such cases after holding at a fixed rate for a while the heart suddenly begins to slow: a sure indication that the limit of endurance has been reached.

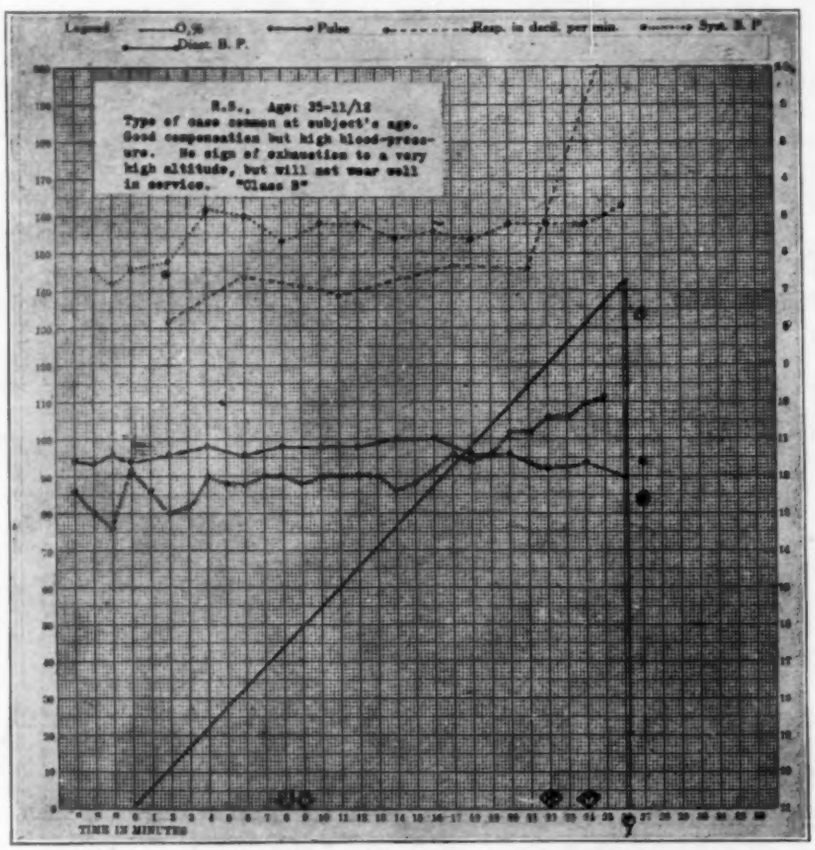
R.S., Age: 35-11/12
Type of case common at subject's age.
Good compensation but high blood-pressure. No sign of exhaustion to a very high altitude, but will not wear well in service. "Class 3"

Chart 2.—Examination of a good man who is too old (note his arterial pressure) to be quite first class.

A total increase of from fifteen to forty beats in the heart rate during a rebreathing test, in which the oxygen is lowered in half an hour to between 7.5 and 6.5 per cent., constitutes a good reaction to oxygen want. A failure to respond by an acceleration of the heart rate to lowered oxygen means either inability to react to a low oxygen of high altitudes and early failure, or that sufficient compensation is secured by increased breathing or blood concentration or both. Our experience indicates that the failure to respond is associated with poor toleration of low oxygen. An acceleration in heart rate of more than forty beats—from 50 to 70 have been observed—throws too great a burden on the circulatory mechanism, and occurs only in men who do not tolerate well low percentages of oxygen. In such men other compensatory reactions may fail to occur. So far as the response in pulse rate to decreasing oxygen is concerned it therefore becomes possible to rate the reactions poor, good and excessive. A poor or an excessive heart response should disqualify the candidate for very high altitudes; he should ascend to only moderate heights.

A delay in the first appearance of acceleration of the heart rate may be due to an insensitive cardiac brain center, while an early response may indicate a mechanism very sensitive and responsive to any decrease in available oxygen. It should be borne in mind, however, that while ordinarily there is an early acceleration in the heart rate, a delay may be due to the efficiency of other methods of compensating to the stimulus of oxygen want.

THE ARTERIAL PRESSURES UNDER DECREASING OXYGEN SUPPLY

The determinations of systolic and diastolic arterial blood pressures show whether the vasomotor mechanism responds to the stimulus of oxygen want in a manner adequate to maintain the increase in the rate of blood flow. At the same time they show whether the heart is compelled to work against an increased resistance. They also give an index, the pulse pressure, of the volume of ventricular output.

In the optimum type of response to the low oxygen of the rebreathing test the systolic pressure remains unchanged, that is, it holds on a level, until the oxygen has been lowered to between 14 and 9 per cent., after which as the oxygen is further lowered it gradually rises. Occasionally there may occur a gradual rise in the systolic pressure beginning with the first increase in the heart rate. This rise in pressure is ordinarily from 15 to 20 mm. of mercury. Other subjects who appear to have tolerated low oxygen equally well, even down to 6.5 per cent., have had a systolic pressure which held at the normal.

A rise in the systolic pressure of more than 30 mm. of mercury—from 40 to 60 mm. have been observed—is very likely due to a vasomotor failure to respond with a dilatation of the arterioles. Such conditions overwork the heart and may result in early circulatory failure.

There are other conditions of systolic pressure that are occasionally found in men undergoing the rebreathing test. A small percentage have a fall in the systolic pressure which begins about the time the pulse rate starts to accelerate, and continues to decline throughout the test. Such men have not tolerated the extremely low percentages of oxygen that men of the optimum type of response have endured. A large number have shown a sharp and sudden fall in the systolic pressure at low percentages of oxygen. This fall, if allowed to continue, leads to fainting. The subject recovers his normal pressure at once if he is returned to atmospheric air.

The best condition in the response of the diastolic pressure to a decreasing oxygen supply consists in an unchanged or slightly increased pressure throughout the test. Many men show a gradual well controlled fall in the diastolic pressure during the terminal period when the systolic pressure is rising. Such a fall in the diastolic pressure, if it occurs slowly and is not great, constitutes a fairly good reaction to extreme oxygen want. It can be explained as a vasomotor dilatation which occurs in order to protect the heart against the rising systolic pressure. In the optimum type of response to low oxygen the terminal fall in the diastolic pressure may not occur. If present it is never very pronounced and comes only after the oxygen is reduced to 9.5 per cent. or less.

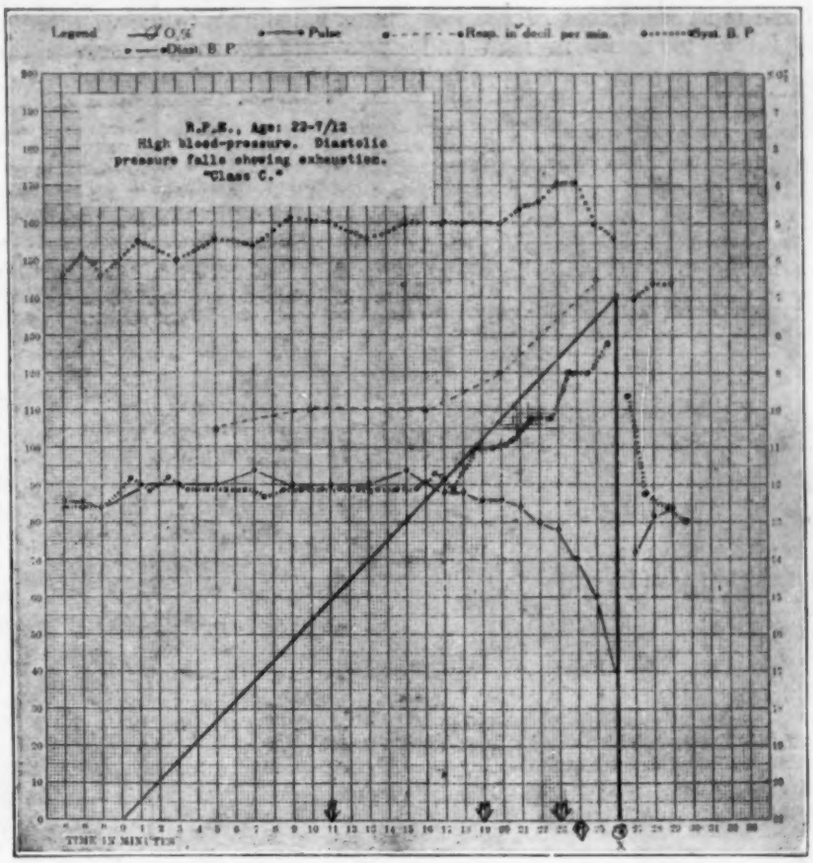

Chart 3.—Examination of a man unfit to ascend above moderate altitudes, unless supplied with oxygen apparatus.

About 66 per cent. of all men examined have had a fall in the diastolic pressure. In at least half of these the fall has been sudden and great. It is always associated with fainting and usually precedes a systolic fall. If the two occur together, in the order just indicated, the experiment must be terminated at once. The pronounced and sudden fall in diastolic pressure may occur at a high oxygen percentage. It has been found to occur as early as 14 and 13 per cent. of oxygen (10,400 and 12,200 feet). Such sudden falls in the diastolic pressure appear to be due to an overcoming of the vasomotor center by oxygen shortage. A decided fall in the diastolic pressure, even if more or less definitely controlled, is an indication that the subject will not tolerate well the altitude corresponding to the oxygen percentage at which it appears.

Three types of circulatory reaction to oxygen want have been observed: The first, the optimum, in which the pulse rate accelerates moderately as the oxygen decreases, the systolic pressure is unchanged or shows a terminal rise of not more than from 20 to 30 mm. of mercury, and the diastolic pressure remains unchanged or rises slightly. The second, the controlled diastolic fall, in which the pulse rate accelerates moderately and the systolic pressure rises as the diastolic pressure gradually falls. The third, the fainting type, in which after a period of fair, good or excessive response in the rate of heart beat to low oxygen, the diastolic pressure suddenly falls, and soon thereafter the systolic pressure, and the pulse rate slows. The optimum type may tolerate as low an oxygen as 6 per cent. (equivalent to an altitude of 29,000 feet) and may lose consciousness without fainting. He recovers quickly when restored to air, while the heart rate and blood pressures are soon back to their normals. The fainting type rarely endures as low an oxygen. If allowed to run his course he faints completely; and as he revives he requires a considerable time, sometimes an hour or two, to regain his normal pulse rate and blood pressures. There are, of course, gradations between the types here described.

The pulse pressure during a rebreathing test remains fairly constant in most men until the oxygen has fallen to between 12 and 9 per cent. (from 14,500 to 22,000 feet), after which it increases in amount during the further reduction in oxygen. The rise in pulse pressure occurs when the systolic pressure is rising and the diastolic either remaining constant or slowly falling. This is also the period when the heart beat is accelerating most rapidly. The amplitude of the heart output, it is claimed, is shown by the pulse pressure. If the pulse pressure be multiplied by the pulse rate and the product be taken as a relative measure of the volume of the blood stream, an increase in the circulation rate will be indicated, beginning between 16 and 14 per cent. of oxygen and progressively increasing as the oxygen further decreases. The period of most rapid flow of blood would, therefore, be that when the pulse pressure is also increasing, that is, from between 12 and 9 per cent. of oxygen to the end of the test. Therefore,

a marked increase in the rate of the circulation of the blood during exposure to a low and decreasing oxygen is indicated. This increase in blood flow is, as shown earlier, an important and necessary compensatory reaction to low oxygen.

Incidently a few venous blood pressure determinations made during exposure to a decreasing oxygen supply have shown a fall which becomes very pronounced when the oxygen is 10 per cent. or less. This fall in venous pressure calls to mind a similar fall reported by Schneider and Sisco in men on Pike's Peak and indicates that the reactions observed in the rebreathing tests are the result of the same cause, low oxygen.

THE HEMOGLOBIN UNDER A DECREASING OXYGEN SUPPLY

Since an increase in the percentage of hemoglobin in the blood is one of the most important of the low oxygen compensations found to occur in men and animals living at high altitudes, it is interesting to find that it may also occur during short exposures to low oxygen. The rebreathing test of not more than thirty minutes' duration is too short to permit a concentration of hemoglobin in the majority of men. In order to test the part that the blood changes may play as a compensatory factor for oxygen want in such a short period as the aviator spends in the air, a series of experiments are now being made in the pneumatic chamber and also under low oxygen. In these the subject is held at a chosen pressure or a given percentage of oxygen for from forty to ninety minutes, the entire experiment lasting as much as two or two and a half hours. The hemoglobin has been determined with the Gower-Haldane hemoglobinometer on blood taken from a finger or an ear and also from a vein in the arm. At least 25 per cent. of all men examined have shown a well defined increase in the percentage of hemoglobin (from 4 to 9 per cent.) and the majority some evidence of concentration. It has been most clearly induced at pressures, and percentages of oxygen corresponding to between 18,000 and 20,000 feet. Almost all of the men have had to be held at the high altitudes twenty or more minutes before concentration began to be evident.

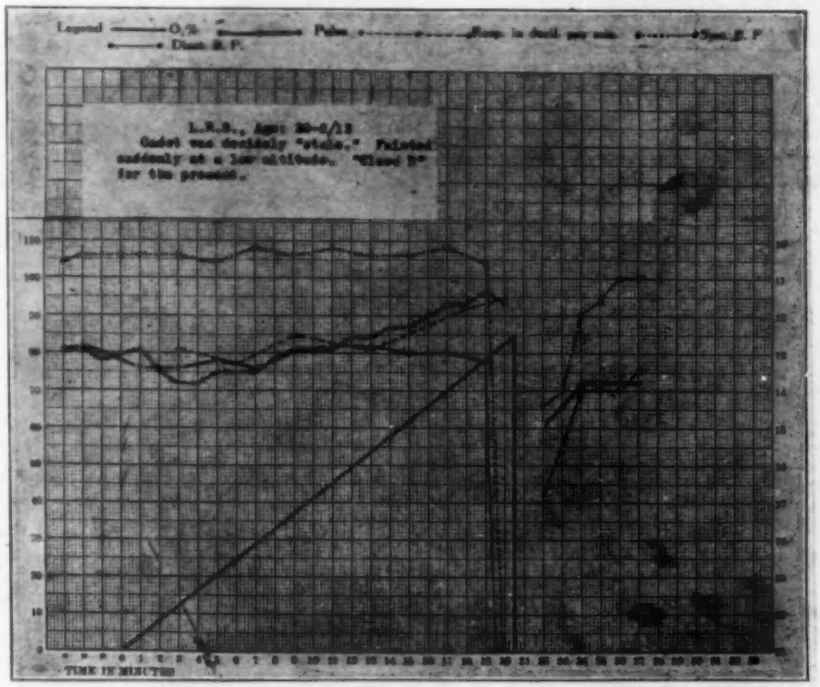

Chart 4.—Examination of a man unfit to fly at all until his physical condition improves.

THE RELATIVE VALUE OF THE COMPENSATORY FACTORS

It is important to obtain a better understanding of the interplay of the compensatory factors when man ascends quickly to very high altitudes and remains only a short time, a few hours at the most. A number of experiments have been made, therefore, with men in the pneumatic chamber, and also under low oxygen, in which they have been held for an hour or two under conditions corresponding to altitudes of from 15,000 to 20,000 feet. In all of these, two of the compensatory changes, those in breathing and circulation, have appeared almost simultaneously and increased steadily with the gradually increasing altitude. When the desired altitude was reached, the breathing either continued at the depth it had acquired during the period of progressive change or it became still deeper for a time. The pulse rate, which gives an index of the increase in the rate of blood flow, accelerated during the period corresponding to ascent and then, when the altitude was held, remained constant or, in some of the men, retarded slightly. The slowing of the pulse rate, when an altitude was thus maintained for a time, was so frequently observed that we sought for an explanation of it. In a number of men it was found that the heart was being relieved by other compensatory factors. In such cases one or the other or both of two changes occurred. There occurred a further deepening of the breathing, or a concentration of the hemoglobin, or both of these changes took place together. Often the breathing, after increasing in amount during the ascent, held at a constant increased depth during the stay at a given altitude; but in such case the hemoglobin was found to be concentrating as the pulse rate slowed. An unusual but interesting case was found in a man whose breathing failed to respond to the changes in altitude. He did not tolerate the low pressure well at first, but felt better after some time had been spent at the chosen pressure. In this man the heart accelerated decidedly, and later his hemoglobin concentrated about 8 per cent. His improvement occurred when the hemoglobin showed concentration.

Our studies show that during short exposures to high altitudes or low oxygen, such as the aviator experiences, the compensatory reactions of the body to a decreased oxygen are made almost entirely by the circulation and by the breathing. A considerable number of men may, after the lapse of about an hour, secure some benefit from a slowly developing concentration of the hemoglobin. The order of response by the adaptive mechanisms is not that of the good reaction seen among mountaineers, in whom the breathing first responds while the other compensatory changes

take place more slowly. The reaction resembles more nearly that seen during an attack of mountain sickness among mountaineers. In such men the heart beat is greatly accelerated during the attack. The aviator, it appears, must depend largely on his heart and his breathing for compensation to the fall in oxygen that he encounters as he ascends.

III. CARDIOVASCULAR OBSERVATIONS*

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MINEOLA, L. I., N. Y.

It has long been known that persons with defective hearts tolerate very badly such altitudes as those of Denver, Phoenix and Mexico City. Many instances have been quoted of serious and even fatal attacks of cardiac dilatation, pulmonary edema, etc., occurring within a few days after the arrival at these places. This popular view has, however, received up to the present very little confirmation from scientific work. Marked alterations in respiration have indeed been described; and the effects on the chemistry of the blood and tissues in reference to transport of oxygen have been studied in great detail. Beyond suggestions, however, that certain changes in blood flow might occur as the result of high altitudes, little evidence has been at hand that the effect on circulation is of great importance; especially there has been entire lack of proof of marked circulatory strain, or of the possibility of such disasters to the heart as have been popularly described.

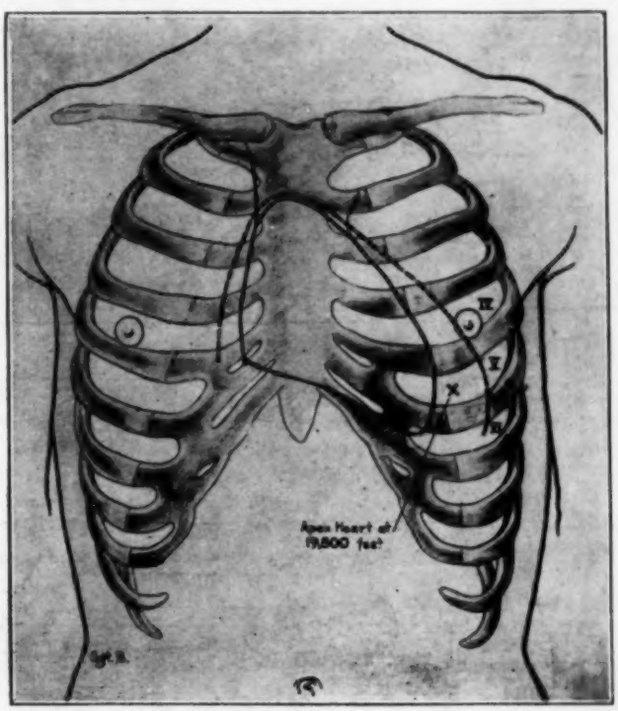

Fig. 1.—Dilatation of the heart under deficiency of oxygen beyond the individual's power of compensation: solid line, percussion outline of heart before and after experiment; broken line, outline at 19,800 feet elevation in low-pressure chamber.

The explanation is that the best type of organism makes its circulatory adjustments so smoothly and with so little strain that there is almost no evidence of anything of great importance going on. It is only by study of less normal types that we appreciate both the serious effects that may be due to failure of circulatory reaction, and the nature of this reaction itself.

Perhaps the most striking single fact brought to light by the present research is that heart failure following marked dilatation is exceedingly common as the result of reduction of atmospheric pressure. Dilatations of from 3 to 5 cm. have been not infrequently found, always followed by collapse and fainting if oxygen is not immediately given. The commonness of this syndrome may be judged from the experience of ten medical officers taken into the low-pressure chamber on two occasions for demonstration purposes. These were men of average constitution, though not of athletic type. Five of them developed marked dilatation, one at 14,000, one at 16,000, two at 18,000 and one at 20,000 feet. It was interesting that in each case the dilatation was discovered by percussion before any subjective symptom was present; but in each case the individual began to feel very ill within a minute thereafter and would have fainted if oxygen had not been administered. It is our practice in using the low-pressure chamber for the observer to take oxygen even at the lower "altitudes."

COMPENSATION BY THE CIRCULATORY SYSTEM FOR LOW OXYGEN

The explanation of many physiologic events lies in the power of the organism to make readjustments to compensate for deleterious changes in the environment. In the compensation for low oxygen, the circulation appears to be the factor of first importance. Changes in respiration, in concentration or chemical constitution of the blood, or in the mechanism of gaseous exchange are important, but they are able to make good only partially for the deficiency. The factor of chief importance with a wide range of adaptability is the rate of blood flow, both in general and as regards special parts. If the blood carries less oxygen per unit, more blood must be sent to the organs that need it in order to furnish the sum total of the amount that is required.

This, of course, means increase in pulse rate, often increase of blood pressure (especially of pulse pressure) and delicate readjustments of blood distribution. All of this calls for accurate control of the vasomotor system and increased strain on the heart. This strain must be carried at a time when the oxygen supply of the heart muscle itself is precarious.

Not only is the maintenance of perfect circulation vitally important for efficient existence at high altitudes, but the heart is itself particularly vulnerable to direct effects of oxygen deficiency. There is the possibility of a vicious circle of a most dangerous kind. For if the circulation falters for a moment, not only will the nerve centers run the risk of subjection to a paralyzing anoxemia, but the nutrition of the heart muscle is impaired. Further interference with circulatory efficiency ensues, and total collapse is inevitable.

Add the fact that this collapse comes practically always without premonitory symptoms of any kind, and the very great danger to the aviator becomes apparent. There is a total reversal of conditions from those of heart strain from vigorous exercise, in which the intense discomfort caused by overexertion gives ample warning that one is approaching the limit, and in which at worst partial failure of the heart would do

* From the Medical Research Laboratory, Air Service, Mineola, L. I.

no more than make further exertion impossible, and so automatically terminate the strain.

This vicious circle may satisfactorily explain many cases of sudden fainting at low altitudes. For if there were a momentary failure of coronary circulation due perhaps primarily to a wholly neurotic influence on the vasomotors, a condition of undernourishment of the heart would be started that would be rapidly cumulative.

The elements of strength in meeting the situation are a strong heart muscle, efficient and accurately adjustable coronary circulation, and the ability of the peripheral vasomotors to allow increase of blood flow to the parts that need it without undue strain on the heart by increased blood pressure. These arterial reactions demand in the first line perfect anatomic condition of the vascular walls and perfect vasomotor control. As a consequence, two classes of cases are found that are most likely to react badly to lowered oxygen tension: men who have any arterial change in the way of sclerosis, and those with poor vasomotor control.

The latter class includes numerous individuals who are either overvigorous in their reactions and run a high blood pressure (often high strung, efficient people) or who have fluctuations of vasomotor tone which are manifested in a variety of ways but eventually lead to an identical result, namely, circulatory collapse and fainting, usually following marked dilatation of the heart.

The "optimum" type of individual will go to extreme heights with practically no signs of circulatory difficulty, and will at the end become unconscious from direct effect of oxygen want on cortical centers, giving quite a different picture from that of circulatory collapse.

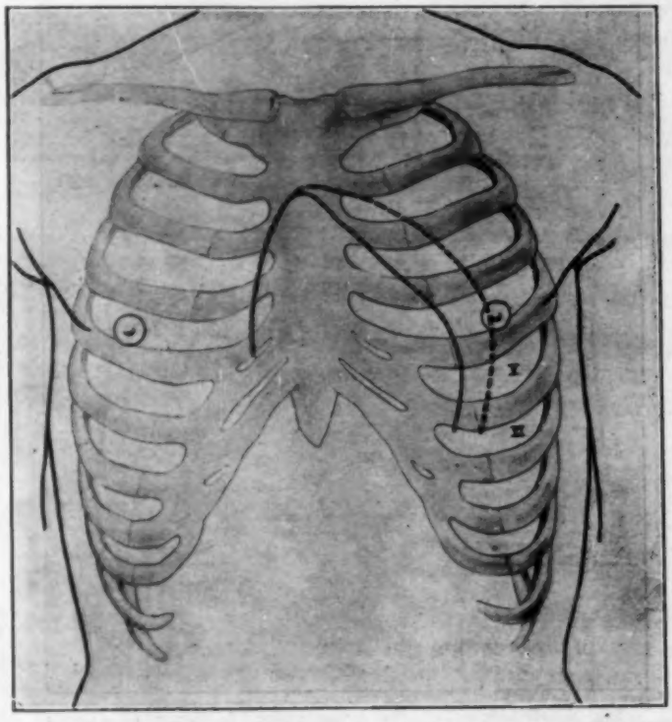

Fig. 2.—Dilatation of the heart at 18,000 feet when man was in poor condition; when feeling well, this man could go 5,000 feet higher without any ill effects: solid line, outline of heart before and after experiment; broken line, heart outline to percussion at elevation of 18,000 feet.

FAILURE TO COMPENSATE

Paradoxically enough, the poorer types of organisms also fail to show heart strain and dilatation. Persons of poor physical and sluggish reactions, whether by nature or because of sedentary life and lack of exercise, ordinarily show a more or less marked failure of the compensations demanded for efficient existence under the altered conditions. They show little or no quickening of the pulse, and no change, or even a fall, in blood pressure. They simply become inefficient instead of making the strain.

Many types with defective hearts and blood vessels do not show heart strain because, having tried to meet the requirements, and having found it impossible, they give up the fight and fail.

Those who do show it, as previously suggested, are persons of vigorous reactions, especially high strung types, but are often "out of condition" for one reason or another. The influence of factors of condition, which are too often underestimated, has been found to be very great. Dissipation, nerve strain, slight infections, may involve heart weakness or abnormal vasomotor reactions which overstrain or undernourish the heart, and thus cause the aviator's death.

CONDITION

The influence of "condition" is a point of the greatest practical importance, of course. One of our hardiest subjects illustrated this. He had been in the low-pressure chamber on one occasion at an elevation of 23,000 feet for some minutes and remained in practically perfect condition. The following day the experiment was repeated; but on the evening between he had dined late with friends, with the usual but not excessive accompaniments. When the altitude of 18,000 feet was reached on the second test he was found to be completely inefficient; he was markedly cyanotic; his heart was dilated 3 cm., and the heart sounds were of very poor quality. He would have collapsed in another minute if oxygen had not been administered.

The question of just what is involved in "good condition" has received much consideration. On the basis of our present knowledge, the most important element seems to be normal vasomotor control, that is, adequate nourishment of the tissues with a minimum of strain on the heart. In this the coronary circulation is of first importance. Other factors are, doubtless, the strength and condition of the heart muscle and probably certain matters of general metabolism, for example, the ability to generate energy rapidly without the accumulation of harmful waste products.

The practical result of this knowledge of the strain on the circulatory system involved in aviation, and the paramount importance of "condition," bear on both the selection and the maintenance of the flying personnel. Only those men should be allowed to fly who possess faultless circulatory systems; and once in the service, aviators deserve the most scrupulous oversight to keep them in as perfect condition as a well-trained football team, and to prevent them from going into the air when they are not in condition.

LOW OXYGEN AS A FUNCTIONAL HEART TEST

As far as the selection of men with perfect circulation is concerned, we possess fortunately a wonderful diagnostic agent in the low oxygen test, to which eventually all flyers will be subjected. We have come to

regard the Henderson rebreathing apparatus as affording by far the most efficient test of the heart, from both anatomic and functional points of view, that we possess.

The strain of making good for low oxygen tension in the atmosphere is so great that any latent defect, fully compensated and not to be discovered by ordinary methods of examination, becomes glaringly apparent during a rebreathing test.

The question of anatomic condition of the valves, however, is not the only consideration with regard to a heart. Many a damaged heart will compensate so well, as the result of the quality of the heart muscle, that its functional power may even be above normal. Clinicians have long been searching for a functional heart test which would tell them, not what the heart was anatomically, but what it could do. In the low oxygen methods we have just such a test, and it should be of great value in ordinary clinical work.

In the case of well compensated valvular disease, murmurs develop under low oxygen or become much stronger, and accentuation of heart sounds takes place, indicating hypertrophy of the left ventricle or back pressure through the lungs; the blood pressure is high and the heart is evidently overworking seriously. Often in young men such a heart will be fully as successful as a normal one in meeting the demands made on it in ordinary life; in fact, overcompensation is the rule rather than a failure to compensate. But under the low oxygen test the underlying defect is revealed.

In the case of valvular lesions that are less well compensated, the heart is more readily reduced to incompetence; after the period of overwork there is marked cyanosis, excessive discomfort, and insufficiency of the peripheral circulation, most delicately shown by inability to perform well on the psychologic apparatus that forms part of the rebreathing test.

In subjects with arterial disease there is a more or less marked rise in blood pressure owing to inability of the peripheral vessels to make way for the increase of blood flow without throwing a much increased strain on the heart. At the same time there is doubtless insufficiency of the coronary circulation as well, so that between high blood pressure and poor nutrition the heart muscle soon becomes incompetent; the heart sounds deteriorate rapidly in quality, and the peripheral circulation becomes insufficient.

Tendencies to arrhythmia are brought out in a remarkable way by the rebreathing apparatus: several hearts that showed at the start only an occasional extrasystole have become arrhythmic to a degree that was positively alarming. We suspect that there is the possibility of danger in this method of examination for hearts showing difficulty of conduction or in which there is a possibility of the development of ventricular fibrillation.

One of the most gratifying features of this work has been the direct bearing of the observations on fundamental questions of circulatory physiology and pathology. In this way they go far beyond the narrow field of aviation medicine in their scope. It is impossible here to discuss thoroughly the many side-lights thrown on clinical medicine. A few of these points may, however, be briefly mentioned.

One is the supreme importance of normal vasomotor control in connection with circulatory efficiency, which means general efficiency as well. Abnormal vasomotor reactions mean either high blood pressure with excessive heart strain if the demands on the circulation are met, or inefficiency if the demands are not met.

The behavior in the test of subjects with more or less marked arteriosclerosis has been of the greatest value in understanding the effect of arterial change[1] under conditions of ordinary life. An interesting fact is brought out by the behavior in the test usually shown by subjects in their thirties, which suggests that arterial change at this age is commonly already considerable. This may account to a large degree for the well known fact that 20 is the best age for flyers, and that every year above this decreases the likelihood of their being able to stand the strain of hard service.

The relation of nerve tension to vasomotor control is a subject on which we have been able to throw some light, and our results fit in well with the demonstration by the British commissions of the intimate relation of the vasomotor system to shell shock, trench neuroses, irritable heart and allied conditions that have contributed so largely to the disabilities of this war. The frequency with which slight cardiac lesions have been demonstrated among presumably healthy men has been striking. Even among a class of men as carefully picked as American aviators we have found more than 5 per cent. These were usually cases that could hardly have been demonstrated by ordinary means of examination, and would have passed the most rigid inspection as "functional heart murmurs" or at worst as borderline cases with a wide margin of safety. Every one who has worked on the Army cardiovascular boards knows how common and how troublesome such cases are; and the British experience shows that men who genuinely have slight organic lesions will not stand up under modern war conditions. For this kind of work the low oxygen test should be of the greatest value.

Similar to this class of cases are "athletic hearts," which we have very frequently encountered among aviators, who are to a large extent drawn from the ranks of college athletes. Such hearts behave very badly under low oxygen. They show high blood pressure, marked heart strain, with exhaustion and eventual collapse. Without entering into any discussion of the question, it may be said that our evidence points strongly to the belief that the so-called "athletic heart" represents not a faulty involution of a normally hypertrophied heart, but a heart that has either been definitely injured by strain, or one with an underlying vascular lesion too slight or too well compensated to be discovered. We have demonstrated slight old mitral insufficiency in several men whose names are familiar on the sporting page of the papers.

1. See Chart 2 in the preceding paper of this series.

Quackery on Both Sides of the Ocean.—Under this heading Dr. Pinkhof comments in the *Nederlandsch Tijdschrift* on the efforts made by the osteopaths to get appointed to the medical corps of the United States Army. He says: "Dr. Gorgas and his staff are better antimonopolists in fact than the legislators in our land (the Netherlands). Our legislators would like to provide a monopoly for the quacks, that is, to confer on them the exceptional privilege of practicing medicine without fulfilling the conditions which every honest citizen has to fulfil. At a recent representative meeting of the organized pharmacists of the Netherlands, the chairman, H. L. Visser, gave a good definition of quackery which may well be taken to heart by every one. He said, 'Quackery, whatever its form, is a gambling game, with life for the stakes and health as the highest prize.'"

IV. PSYCHOLOGIC OBSERVATIONS AND METHODS*

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Major, S. C., N. A.
MINEOLA, L. I., N. Y.

The psychologic tests now used in determining the ability of candidates for the aviation service to withstand altitude have been developed for use under the practical conditions of the Henderson rebreathing apparatus, in which the rate of oxygen decrease is rapid. The statements made here with regard to the course of the phenomena apply only to conditions of brief ascents, and do not necessarily hold in all particulars for cases in which the aviator is kept at corresponding altitudes for long periods of time.

The effects of oxygen insufficiency on the physiologic process were in the beginning of our work studied empirically, with the least possible hypothetic guidance. Our results square distinctly with the conception of psychologic processes as integrative, that is, as dependent on the working together of the central nervous system as a whole rather than on the action of any specific parts of the system.

The basic and important psychologic effects of oxygen deficiency are on voluntary sensorimotor coordination and attention. Until asphyxiation reaches the stage in which the integrative mechanism is rapidly approaching the condition of complete failure, no effects are demonstrable that are not clearly the failure of the one or the other, or both, of these two mental factors. In the prefinal stages perception is as efficient as the muscular control of the sense organs and organs of expression, and the power to attend to the stimuli, permit. Discriminative judgment, likewise, shows no falling off in rapidity or accuracy except as impaired motor control and attention produce it. Memory, both "immediate memory," as tested by the ability to reproduce what has been perceived or learned immediately before, and "true memory," as tested by the ability to reproduce something that has been "latent" for a certain interval after being learned, is apparently not affected, except as the inability to attend to the details in learning or in reproducing, or inability to control the muscular mechanism of expression, may enter. The efficiency of limited neuromuscular groups, as indicated by dynamometer tests, is not impaired in the prefinal stages of asphyxiation.

As instances of tests involving perception and discrimination, we may cite the copying of a list of words and the translation of words into code. In both of these cases, speed and accuracy are maintained up to the final stages of asphyxiation, provided the muscular mechanism of accommodation and convergence is not seriously affected; although the mechanism for handwriting may be so affected that the written results of the list are legible with difficulty.

In more complicated discrimination, in which rapid and accurate recognition and classification of material are required, the results are similar. Ability to locate correctly on a chart the positions of objects previously seen is unimpaired up to the point at which the individual's coordinations of movement become so much affected that the charting is defective on that account.

It is interesting to note that the sensitivity and acuity of the sense organs show no consistent impairment, and that apparently the speed of simple reactions (the simple reactions do not, in general, require a high degree of integration) is not intrinsically diminished. More work remains to be done on simple reactions, however, before definite statements can be made. The distinctive effect on the nervous system, in short, seems to be a change in its integrative action, and not a change in the efficiency of any particular part or unit. The whole picture of progressive asphyxiation, from a psychologic point of view, is strongly suggestive of the picture of progressive alcoholic intoxication.

Under the practical requirements of rating, tests must be single and brief, during progressive depletion of the oxygen supply. If many individuals are to be examined it is not practicable to spend even several hours on each one. Hence it is not possible to hold the subject at a moderately high altitude, such that asphyxiation effects will eventually appear. Nor is it possible to repeat a briefer test a number of times. Hence, the subject must be allowed to rebreath himself rapidly (during not much over a half hour, at most) to a low point of oxygen tension, reaching his maximal "altitude" for that rate of "ascent." It follows that the method used must be one which is not approved for psychologic work under other conditions, and which, for want of a better term, is called clinical. That is, since the reactor's condition is rapidly changing from minute to minute, we must be able to determine at any minute his psychologic condition, and cannot use the method (more exact under other conditions) of determining the average speed and accuracy of work done during a period of several minutes.

It was early discovered that under asphyxiation, as under alcoholic intoxication, it is possible for a reactor to "pull himself together" for a brief span of time (a minute or even several minutes), during which his efficiency on a set task may be as high as in his normal condition, or even higher, sinking at the termination of the task to a relatively low level of efficiency. If given a series of tasks, with brief resting intervals between, the reactor may therefore accomplish a performance that is practically normal, even up to a minute or two before the point at which complete lapse of integration occurs. In this way, his real psychologic deterioration may be concealed. It is necessary, therefore, to set a task which, although minimally fatiguing, is practically continuous, allowing the reactor no expected periods in which no work will be demanded of him, and thus preventing him from making use of attention peaks, as the phases of "pulling himself together" may justly be called. In determining the sensitivity or acuity of sense organs, on the other hand, the "attention peaks" are precisely in order, and pause should be taken to present the stimuli at the highest peaks.

It is probable that in earlier work on the action of alcohol and other drugs, and of fatigue, many failures to find psychophysical effects were due to the evoking of attention peaks by brief or periodic tests, thus masking the real condition of the patient tested.

Many tests that otherwise would be applicable impel the reactor to hold his breath during the crucial moments. The conventional steadiness test is one of this sort. If the reactor, already suffering from oxygen deficiency, holds his breath for twenty seconds, or largely reduces his breathing during that period, he makes a large change in his oxygen supply. Hence

*From the Medical Research Laboratory, Air Service, Mineola, L. I.

the purpose of the test is largely defeated. The steadiness test, and others in this class, although some show marked effects of low oxygen tension, cannot be used.

The apparatus used in administering the psychologic test we have called the "L V F" apparatus. The principal parts of the apparatus are assembled on a table with a top adjustable in height and slope, supported on a single heavy post from a cast iron base. This table (the so-called Dunlap table) is designed to give the necessary rigid but convenient mounting.

APPARATUS AND METHOD OF TESTING

The apparatus mounted on the table is designed to require attention and reaction on the part of the man undergoing the test analogous to the conditions of the pilot in the air. It allows the slightest deviation of reaction or lapse of attention to be noted. It consists of three separate units:

1. A series of fourteen stimulus lamps (2 candle power) arranged in two rows of seven each, with two similarly arranged rows of contact buttons, each button surrounded by a metal washer; a green check lamp and a red error lamp, and a stylus with a hard rubber handle and metal tip. These parts of the unit are so wired electrically that when a stimulus lamp is lighted the corresponding contact button is "alive," and if touched with the metal tip of the stylus causes the check lamp to light. If the washer surrounding any of the buttons is touched with the stylus at any time, the error lamp is lighted.

2. Two ammeters, mounted on a metal arm above the table top. These are connected in series with two rheostats, one on the upper side of the table top at the edge nearer the reactor, the other underneath, at the edge nearer the observer. One ammeter faces the reactor, the other the observer. A change in the resistance made by the observer at his rheostat, causing a change in the ammeter reading, may be compensated for by a change in the reactor's rheostat, by which the original ammeter reading may be restored.

3. A small electric motor, mounted on the upper side of the table top. This motor is connected in series with a third rheostat underneath the table. A two-way lever switch mounted underneath the table at the observer's edge and a rocking pedal two-way switch on the floor under the table, connected with the rheostat, can be cut out (thus increasing the speed of the motor) by either switch, and again cut in (thus restoring the lower motor speed) by either switch.

In order to control the fourteen stimulus lamps, lighting them at the proper time, an accessory piece of apparatus is mounted on a small table in any convenient position, and electrically connected with the apparatus on the Dunlap table. At first, this accessory apparatus consisted of a button board, having fourteen buttons corresponding to the fourteen lights; and from these buttons an enlisted man controlled the lighting of the stimulus lamps, timing his actions by a stop-watch. For this button board an automatic distributor is now being substituted, which both times and selects the lights, being operated by a synchronous motor.

Before the rebreathing is commenced, the reactor is given carefully formulated instructions, and if necessary he is coached during the first three minutes of the work. His tasks are as follows: 1. As soon as a stimulus lamp lights he must touch with the stylus, held in the right hand (except in the case of left-handed subjects), the corresponding "button," touching it accurately and carefully. 2. Whenever the motor increases speed, as indicated by a change in its sound, he must bring the speed down to normal again by throwing his pedal switch. 3. When the hand of the ammeter is changed from its standard position, he must bring it back to standard by varying the position of the rheostat handle.

During the early part of the test, the psychologist notes the composure and attention of the reactor, and his comprehension of the instructions; also his motor tendencies, which are recorded in a fixed scale of types. Further, the psychologist watches for the beginning of the effects of oxygen deficiency on attention and coordination; for the moments at which these effects attain a certain standardized importance, and for the final moment of "complete inefficiency," which will be followed very quickly by a complete breakdown and unconsciousness unless the reactor is given air. Since the change in the reactor's condition is very rapid at this phase, and the effects on the nervous system lag behind the respiratory conditions somewhat, prompt relief is necessary, or the reactor may become unconscious after being given air: before the renewed air supply "catches up" with the nervous system, as it were.

RESULTS

The various ways in which the effects on coordination and attention are manifested in different reactors have been carefully analyzed and studied, and, as a result, very satisfactory results are obtained.

In addition to the practical application of the tests to the rating of aviators, we have obtained results that have considerable scientific value for future psychologic work. The application of our general method (that is, involving a group of continuous tasks) to the study of problems of drug and fatigue action is an obvious possibility. Our specific apparatus and routine are adapted to the oxygen rating problem alone, but modifications to suit the purposes of research may be readily made. One such modification has been made already by Captain Dockeray, for work on fatigue and "staleness," and is being given thorough trial. Carefully worked out series of experiments on discrimination and judgment, code translation, mathematical operations, memory, auditory functions, etc., have been made under the supervision of Captains Dockeray and Johnson and myself for the purpose of checking my earlier results, and tests on handwriting have been made by Major Watson in the low pressure tank. These, in addition to their bearing on the rating tests, have produced important scientific results.

In working on the psychologic factors in blood pressure changes, striking indications of the presence of which appeared in the rating tests, we have found strong evidence that apprehension is uniformly accompanied by a rise in systolic pressure, which tends shortly to return to normal, but that when actual fear is present the rise is much more sustained. The conditions under which the rise due to apprehension occurs are somewhat complicated; we should have reason to expect it under practical conditions, for example, when the flying cadet is notified that he is to make a flight, with possibly entire subsidence a short time later when he actually gets into the machine.

Some Thrift Expedients in Germany.—P. Bonnette relates in the *Presse médicale* of recent date that the Germans are putting up fruits with tablets of sodium benzoate and sodium cinnamate, without sugar. The sugar can be added when they are to be served if desired. Milk to be transported any distance is frozen in large cakes kept in isolating containers. Fallen leaves are collected in large quantities, dried in ovens, ground, mixed with molasses and pressed into cakes which are fed to animals in the place of oats. He quotes a Munich paper to the effect that these dried leaves make excellent fodder for animals, especially the leaves of the elder. They are said to be richer in albumin than hay, and easier to digest as they do not contain so much cellulose. Visitors to the Leipzig fair were notified that they must bring their own tablecloths and napkins if they wanted any. Shrouds for the dead are made of paper, and he states that it is being debated whether to make it compulsory to exchange the clothes of the dead for paper substitutes.

V. THE EFFECT OF ALTITUDE ON OCULAR FUNCTIONS*

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AND
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The examination of the aviators for the Air Service of the United States is much more strict than that of any other nation. In spite of the careful examination that eliminates men with manifestly imperfect eyes, fliers sometimes exhibit marked derangement of the ocular functions under the stress of flying and the conditions connected with it.

In all articles pertaining to the selection of aviators, from the Allies or from alien countries, normal vision is considered to be the chief requisite. Surgeon H. Graeme Anderson of the Royal Naval Service and adviser to the British Air Medical Service, in a discussion of the physical qualifications of fliers, says, "Practically every one of the physicians and officers taking part in the discussion agreed that the function of vision was of the greatest importance."

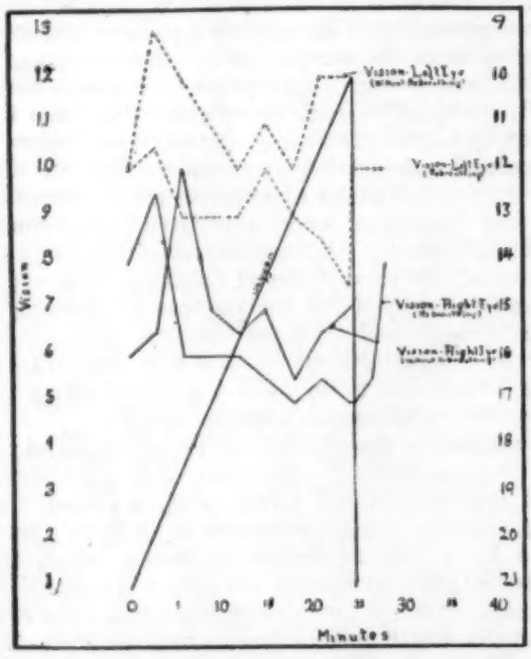

Fig. 1.—Effect of lack of oxygen on visual acuity, showing decrease during test on rebreathing apparatus.

With this in mind, visual acuity under oxygen depletion, as compared with the behavior of this function under normal oxygen supply, has been studied with the aid of the Ives visual acuity test object, Snellen's type and Johnson's apparatus.

It was soon found that Snellen's type and similar test objects were unsatisfactory for use with the rebreathing apparatus and that the observations thus made were inconclusive. The accompanying tabulation gives the results of visual tests made on thirty-three subjects on the rebreathing apparatus and in the low-pressure chamber, with the aid of the Ives instrument.

*From the Medical Research Laboratory, Air Service, Mineola, L. I.

The subjects are classified as normal and subnormal, that is, those who, so far as the eyes are concerned, would pass the examination for the flying corps and those who would be ocularly disqualified.

RESULTS OF VISUAL TESTS

	Normal		Subnormal.	
	No.	Per Cent.	No.	Per Cent.
Vision improved	3	12	..	....
Vision deteriorated	7	28	3	37.5
No change	15	60	5	62.5

The eight subnormal cases were so classed because of defective vision due to errors of refraction.

As Dr. Guilbert of the French Air Service says that, "at 2,000 meters, in general, the visual acuity increases by a third by reason of the congestion of all the organs of the head, and in particular of the choroid and retina," we have tested the visual acuity of twelve subjects while inhaling 2 minims of amyl nitrite, thus causing congestion of the vessels of the head. In all of the cases but one (a myope) there was impairment of the vision during the period of maximum nitrite effect.

JUDGMENT OF DISTANCE AND STEREOSCOPIC VISION

In the judgment of distances there are many factors involved, practice and training play a great part. The power to stereoscope accurately and quickly gives, according to our experience, most valuable aid in determining the flier's ability to judge distance.

The stereoscopic vision was tested, on the Henderson rebreathing apparatus and in the low-pressure chamber by the use of the ordinary stereoscope. The ability to maintain perfect stereoscopic vision at different altitudes was noted.

Six normal cases examined on the rebreathing apparatus showed change in only two. These manifested a confusion in this power at high altitudes.

One of the three subnormals examined in this way became confused at the time of his general break; the other two remained unchanged.

Three normals and three subnormals were taken in the low-pressure chamber. One out of each group showed a confusion at high altitudes. One of these manifesting confused stereoscopic vision was rapidly restored to normal by the administration of oxygen.

REACTION TIME

It is absolutely essential that the pilot think and act quickly and accurately, for the man with the quickest reaction usually lives to tell the tale. The French and Italians have placed great confidence in determining simple reaction time, that is, one possible reaction to one possible stimulus. This form of reaction is too apt to become a simple reflex and hence become independent of the higher processes. Therefore, this laboratory has chosen the Reeves visual discrimination reaction time experiment with four possible reactions and five possible stimuli. The subject sits facing a ground glass plate on which the stimuli appear, and he reacts to the various stimuli by pressing the key corresponding to the stimulus presented. The instant the stimulus appears, the Dunlap chronoscope begins recording time, and is stopped by the subject's reaction. All false reactions are recorded by means of a secondary circuit. The average discrimination reaction time for normal subjects has been found to be around half a second.

COLOR VISION

Normal color vision is considered a requisite for a good pilot by all Allied air services. The object of our tests has been to determine the effect of low oxygen tension on color vision.

Stilling's plates were used in these tests. Five subjects were examined in the low-pressure tank and carried to 20,000 feet or above. Five subjects were examined on the rebreathing apparatus and carried above 20,000 feet. This series of subjects, during the entire experiment, showed no change in color vision. Threshold color vision will be considered under retinal sensitivity.

FIELD OF BINOCULAR FIXATION

It is important that the aviator be able to carry the eyes as far as possible in the various directions without seeing double. If a man has a contracted field of fixation, it necessarily impairs his ability in flying. The field of binocular fixation has been taken by means of the Schweiger perimeter modified for binocular use or by means of a large tangent screen, the Wilmer wand and Wilmer glasses being used. Of 122 men acceptable for the Aviation Section, Signal Corps, who have been examined and sixteen who were not acceptable, 7.37 per cent. of the normals showed contraction of the field of binocular fixation, and 50 per cent. of the subnormal men showed contraction. Narrowing of the field was most marked above.

MUSCLE BALANCE

Normal muscle balance should be insisted on, for even a small defect may be accentuated by the strain of flying and lack of oxygen, resulting in diplopia or at least a marked contraction of the field of binocular fixation at low altitudes. Exophoria and hyperphoria are more serious than esophoria. Twenty-five men,

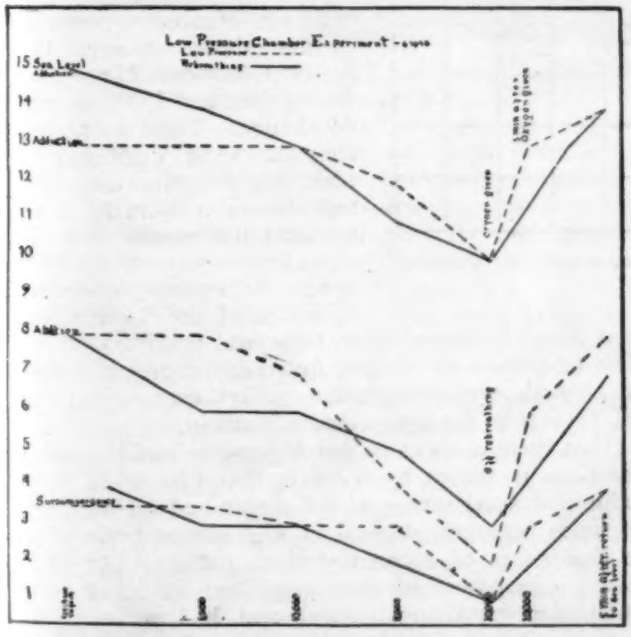

Fig. 2.—Effect of lack of oxygen on the strength of the ocular muscles. Rebreathing and low-pressure findings compared. Note return of strength on administration of oxygen, even when under low barometric pressure in the decompression chamber.

ocularly acceptable for the Aviation Section, Signal Corps, were examined in the low-pressure chamber and on the rebreathing apparatus. Abduction decreased 1.31 degrees at 15,000 feet and 1.55 degrees at 20,000 feet. Adduction decreased 1.75 degrees at 15,000 feet and 1.90 degrees at 20,000 feet. Sursumvergence decreased 1.15 degrees at 15,000 and 1.25 degrees at 20,000 feet.

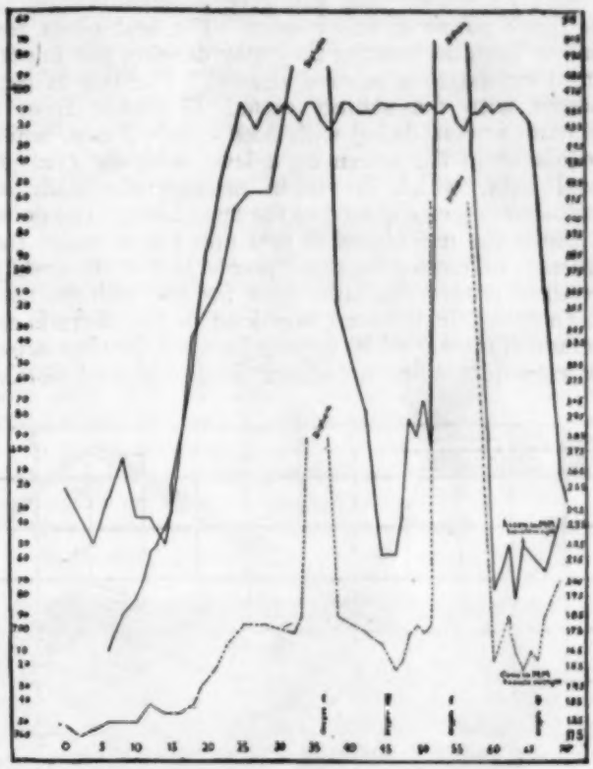

Fig. 3.—Falling off of accommodation and convergence in low-pressure chamber and return of strength on administration of oxygen.

FIELD OF VISION

Every aviator insists primarily on the broadest visual field obtainable; and in view of the fact that the research work done shows a contraction of the visual field under lowered oxygen tension, it is important to see that poorly constructed goggles do not further cut down the fields.

The fields for form and color have been taken in the low-pressure chamber at 5,000, 10,000, 15,000 and 20,000 feet; and when contraction is noted at 20,000 feet, oxygen is administered. To make sure that the changes are not due to fatigue, controls have been taken at sea level corresponding in time of day and in time interval to those taken in the low-pressure chamber. At 5,000 and 10,000 feet there is usually a slight enlargement of the fields for form and color, at 15,000 a slight contraction, and at 20,000 a marked contraction. Twenty men have been examined, and at 20,000 feet the fields for form have shown a contraction of 14 per cent. of their original size below, 3.5 per cent. in the temporal field, 4 per cent. above, and 8 per cent. in the nasal field. The red has lost 9 per cent. below, 6.5 per cent. temporally, 4 per cent. above, and 6 per cent. nasally. The green, 4.5 per cent. in the lower, 5 per cent. in the temporal, 5 per cent. above, and 25 per cent. in the nasal field. Five minutes after returning to sea level, fields are normal in size. Giving oxygen at 20,000 feet for four or five minutes causes a return of the field to normal. Several fields have been taken on the rebreathing apparatus, and the results are fairly comparable with those found in the low-pressure chamber.

PERCEPTION OF MOTION AND ITS DIRECTION BY THE RETINA

Perception of motion and its direction is of great importance to the aviator, and a test has been devised in this laboratory that will give some indication of the flier's power in this respect. The best pilots feel that by constant practice they may develop this important function to a marked degree. The test is performed with the subject seated 15 inches from a Bjerrum screen, fixing with both eyes a 3 mm. white pin placed in the screen on a level with the eye. A small light, which is visible through the cloth or neutral gray paper is used as the test object. The point at which the test object is first noted and where the direction of motion in three planes is first accurately described is recorded on a chart for use with the tangent screen. In the men examined so far, there is an average difference of 10 degrees between the time when the test object is first noted and the direction of motion is accurately described. It is hoped that this test may prove of value in the selection of aviators for special work; for example, scouting and fighting.

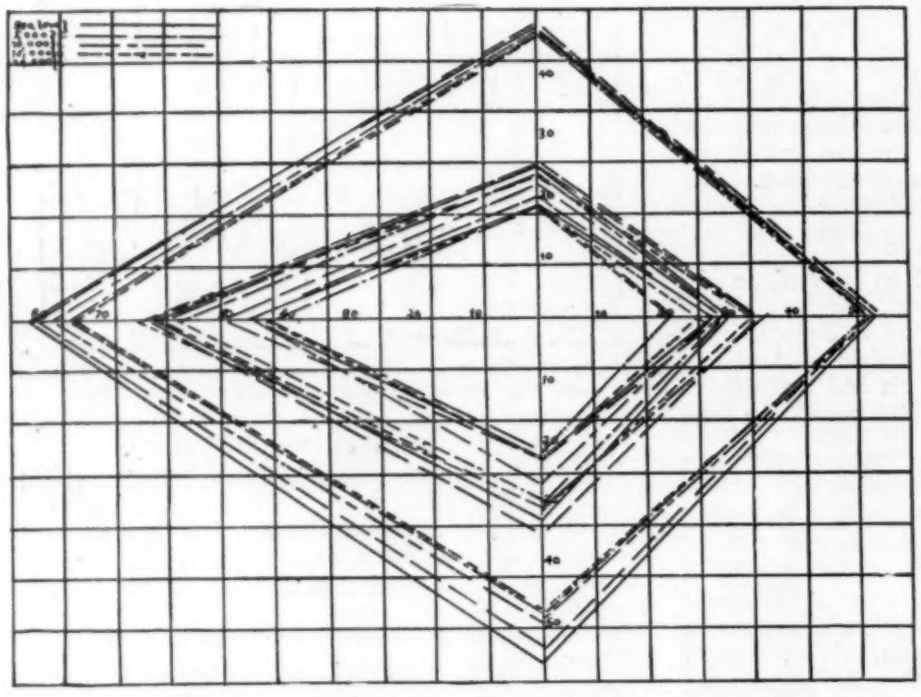

Fig. 4.—Contraction of field of vision in low-pressure chamber at pressures equivalent to 5,000, 10,000, 15,000 and 20,000 feet.

THE EYE AND THE EQUILIBRIUM

The eye is one of the many factors in the complicated problem of maintaining equilibrium. That many aviators depend largely on their visual impressions in the maintenance of equilibrium is evidenced by the fact that many of them tie a piece of string as a streamer to one of the forward struts, thus to obtain the first sign of a side slip while flying in a cloud.

INTRA-OCULAR TENSION

In connection with the various aviation problems, where there is the factor of lowered barometric pressure as well as lowered oxygen tension, the intra-ocular tension has been taken at different altitudes. Fourteen men have been examined in the low-pressure chamber. The examinations so far have not been numerous enough to draw very definite conclusions. We have found, however, no correlation between the intra-ocular tension and the blood pressure, lowered oxygen tension and various cardiovascular changes. Later on, a detailed report on this subject will be possible.

ACCOMMODATION IN FLYING

It is important that the flier maintain his ability to accommodate under all conditions to which he is subjected, for his life may depend on his ability to see clearly. The near point of accommodation has been taken every minute in the low-pressure chamber and on the rebreathing apparatus, a Prince rule with Jaeger test type or the Duane disk being used as a test object. Normal runs have been made without the low oxygen tension effect for the purpose of comparison. One hundred and forty-eight men, acceptable for the Aviation Service as fliers, were examined on the rebreathing apparatus. Of these, 44.6 per cent. showed a receding of the near point, and 18 per cent. showed improvement, fluctuating changes in accommodation were noticed in 14.4 per cent., and no change in 23 per cent. Eleven subnormal cases were examined, and 63.7 per cent. manifested a decrease in accommodative power, 18.3 per cent. an apparent increase, 9 per cent. no change, and 9 per cent. variable reactions. The low-pressure chamber findings were practically the same as those with the Henderson rebreathing apparatus. Of seventeen normal men examined, 47 per cent. showed decrease in accommodative power, 11.7 per cent. increase, 23 per cent. fluctuation, and 17.8 per cent. no change. Three subnormal subjects were examined in the low-pressure chamber; two showed a decrease in accommodative power, and the other gave a varying reaction. When the subject is brought to sea level the accommodation comes back rapidly in some and slowly in others. The inhalation of oxygen invariably causes a return to normal, even though the subject may be kept at 20,000 feet in the low-pressure chamber.

That these changes do not follow the cardiovascular reactions is shown by the fact that fifty-seven men, exhibiting acceleration of pulse rate and maintenance of pulse pressure, showed in 42.1 per cent. decrease in the power of accommodation, and 15.8 per cent. increase in power of accommodation, 15.8 per cent. fluctuation in accommodation, and 36.3 per cent. no change in accommodation. Our researches would lead us to believe that hyperopes and subjects with a marked amount of hyperopic astigmatism show the most marked changes in accommodation.

Fatigue of accommodation has been studied with Howe's ophthalmic ergograph as modified by Captain Berens. Normal three-minute runs were made without the low oxygen tension effect as controls; then

three-minute runs with the same time interval were made in the low-pressure chamber and on the rebreathing apparatus. The findings on the rebreathing apparatus and in the low-pressure chamber showed, at 15,000 feet, a more rapid onset of fatigue than was evidenced by the controls; and at 20,000 feet, the fatigue was marked. The administration of oxygen in the low-pressure chamber or rebreathing apparatus rapidly restored the normal tone of the ciliary muscle.

CONVERGENCE

The near point of convergence has been tested, because of the belief that the aviator should have binocular vision and that a weakness in convergence, which might lead to diplopia, would certainly impair his efficiency and could easily result in an accident. A U-shaped piece was cut out of the Prince rule to fit over the nose, and a 2 mm. black dot on a white background was used as a test object for making this determination. Readings were taken without low oxygen tension effect and with low oxygen tension effect, and the effect of the administration of oxygen was determined. Readings were taken every two minutes and charted. One hundred and forty-seven men with normal eyes were examined on the Henderson rebreathing apparatus, of whom 50.3 per cent. showed decrease in convergence power, 17.6 per cent. increase, 11.5 per cent. fluctuation, and 20.6 per cent. no change.

Of eleven subnormal men examined (six were disqualified for visual acuity and five for muscular imbalance), 45.7 per cent. showed decrease in power of convergence. Increased converging power, fluctuating changes and no change in the near point of convergence were each noted in 18.1 per cent. Of sixteen normal men examined in the low-pressure chamber, 50 per cent. showed falling off in power of convergence, none showed increase, fluctuating reactions were present in 12.5 per cent., and 37.5 per cent. remained unchanged. In the subnormal group the recession of the near point was very marked, sometimes resulting in diplopia.

It was attempted to show what relationship, if any, exists between the convergence and the cardiovascular reactions to low oxygen tension. Seventy-two subjects showing an increase in pulse rate and a maintenance in pulse pressure gave these convergence changes, which would seem to indicate the ocular changes cannot be predicted by the cardiovascular reaction and vice versa: 54.2 per cent., decrease in power of convergence; 15.3 per cent., increase; 9.7 per cent., fluctuation, and 20.8 per cent., no change. The results would indicate that the Henderson rebreathing apparatus and low-pressure tank give almost identical findings, and in each case the determining factor seems to be the lowering of oxygen tension, because the administration of oxygen soon causes the convergence near point to return to normal, irrespective of the barometric pressure.

Fatigue of convergence has been studied with Howe's ophthalmic ergograph. Normal three-minute runs as controls were made without the low oxygen tension effect; then three-minute runs with approximately the same time interval were made in the low-pressure chamber and on the rebreathing apparatus. The findings on the rebreathing apparatus and in the low-pressure chamber showed a more rapid onset of fatigue than occurred with the controls. At 15,000 feet and at 20,000 feet the fatigue was marked, as was the case with accommodation. Here also the administration of oxygen caused a rapid return of converging power.

RETINAL SENSITIVITY

It is important that the retina be normally sensitive to light impressions, especially for those men who must fly at night, notably bombers and fliers doing patrol duty. A test for the contrast sensitivity of the retina has proved most useful and practical for our work, and only men who have normal sensitivity in this respect will be selected for night flying.

In this laboratory, tests to determine the threshold sensitivity of white and colored lights and for contrast are conducted in the following manner:

The Reeves wedge is made of two pieces of glass at a known angle, between which is run a solution of gelatin and neutral dye. The wedge is calibrated in millimeters, which is translatable into the percentage of light transmitted.

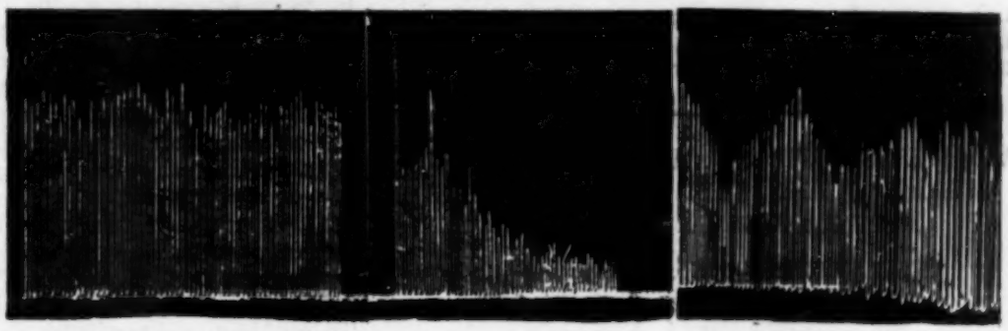

Fig. 5.—Fatigue of accommodation: Normal at sea level (left hand record); rapid fatigue at 22,000 feet in rebreathing test (middle record), and variations occurring 1.3 minutes later, subject breathing normal air (right hand record).

To test the threshold sensitivity to light, the subject is placed 20 feet from a spot of light, 3 mm. in diameter. Holding the wedge before the right eye, he slowly draws the slide from its cover, and as the light just disappears, a reading is taken. This reading is in millimeters and is then translated to percentage of transmission.

The threshold for color is taken the same as the foregoing, red and green lights, which are practically monochromatic, being employed.

The test of contrast sensitivitiy is made with a Reeves wedge and Reeves contrast square. The contrast square is made by placing a square of dark gray paper on a larger square of lighter gray, there being thirteen perceptible differences between the two papers. An illiterate "E" with the same perceptible differences is used as a check of the findings. This is lighted by a 75-watt nitrogen daylight lamp at a given angle and distance from the test object, and the subject is placed 20 feet in front of the object. The reading on the wedge is taken just as the contrast between the squares disappears. The average readings taken with the contrast sensitivity square gives 3.4 mm., and the illiterate

"E" 3.2 mm. To date, the normal for the light threshold of thirty-five subjects is 6.5 mm. The threshold for colors is: red, 4.4 mm., green, 3.7 mm.

Under the rebreathing test the threshold for light has shown an improvement in 25.9 per cent.; 44.5 per cent. show neither improvement nor falling off, and 29.6 per cent. show a falling off in sensitivity.

In the study of the threshold for colors, the red and green both show a falling off in 71.4 per cent., and neither a gain nor a loss in 28.6 per cent.

In former tests with a blue light, which was not absolutely monochromatic, there was improvement in 66.6 per cent. and falling off in 33.4 per cent.

CONCLUSION

In spite of the fact that the tests made in the laboratory are influenced somewhat by the psychologic elements of excitement, concentration, etc., still, we have found very sensitive and definite ocular reactions under the conditions to which the airman is subjected. The changes in the eye (one of the most delicate of the peripheral sense organs) are due mainly to the want of oxygen, and not to the many other suggested conditions, such as lowered blood pressure, decreased atmospheric pressure, carbon monoxid, nervous strain, and vibration of the motor. In our experience, the administration of oxygen prevents the occurrence of the untoward symptoms; but when these symptoms have occurred through its want, oxygen quickly restores the functions to normal.

VI. INFLUENCE OF ALTITUDE ON THE HEARING AND THE MOTION-SENSING APPARATUS OF THE EAR*

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The middle ear mechanism is normally adjusted to transmit sound vibrations in either direction. Ordinarily this apparatus is largely occupied in transmitting sound vibrations from without inward. The membrana tympani is set into vibration by impact of vibrations transmitted by the air in the external auditory canal, and the ossicular chain carries the vibrations across the tympanic cavity to the footplate of the stapes, which, with its annular ligament, fills the oval window. The perilymph there receives the impact, and owing to the venting action of the internal drumhead of the round window, this incompressible fluid is enabled to take up the vibrations and distribute them by way of the saccule and cochlea in such a manner as to bring about interaction between the sensory cells of Corti and the tectorial membrane. This stimulation causes these cells to emit nerve impulses which are translated in the sensorium into hearing.

Whereas the conformation of the auditory canal, tympanic cavity, saccule, scala tympani, and scala vestibuli is such as to facilitate delivery of most of the incoming vibrations to the cells of Corti, the petrous bone conducts a certain amount of the incoming vibrations away from their ultimate cochlear distribution.

Any obstruction in the path of these vibrations determines an increase in the conduction of sound vibrations away from the Corti cells, and the volume of such afferrent vibrations is directly proportionate to the amount of obstruction.

Sound vibrations are also conducted to the tympanic cavity by way of the bony structures of the skull, and a certain amount of such vibrations are conducted away from Corti's cells by way of the ossicular chain, membrana tympani and thence the air in the external auditory canal.

By utilizing certain uniform sound stimuli applied in the form of standard tests and observing responses, it is possible to determine the normality of sound conduction and sound perception; also the general character of certain abnormalities of sound conduction and sound perception.

The motion-sensing mechanism of the internal ear is situated within an intricate physical instrument, the utricles and semicircular canals; one half of this physical instrument is housed in the right petrous bone, the other half in the left. Motion to which this instrument is subjected is immediately participated in by the fluid contained within it and brings about an interaction between the hairs of the sensory cells of the cristae and the cupula surmounting them, causing stimulation of these sensory cells and emission of nerve impulses, which are translated in the sensorium as sense of the body being in motion. A certain quotum of these impulses originating in the cells of the cristae are distributed as motor impulses to the extra-ocular muscles, causing involuntary movement of the eyes.

By utilizing certain uniform motion stimuli applied in the form of standard tests, and observing responses in a certain standard manner, it is possible to determine the normality of motion perception of this apparatus, and of eye movements resulting from stimulation of the cells of the cristae; also the general character of certain abnormalities of motion sensing and of eye movements.

Without going into the details of standard tests of the cochlear and vestibular (or motion-sensing) portions of the ear, which would entail a discussion too voluminous for presentation in this connection, it may be briefly stated that experiments have been conducted with a view to determining the effects of altitudes on each of these ear functions. In these experiments, both the Henderson rebreathing apparatus and the decompression tank types of artificial altitude have been utilized.

It has been determined that the hearing function shows no deterioration attributable to impairment of the perceptive element (stimulability of the Corti cells) prior to attaining a degree of altitude that causes acute general functional impairment of all the higher cerebral sensory and psychic centers. This condition is signalized by the onset of semiconsciousness or unconsciousness.

During ascent from a denser to a rarer atmosphere, the sound-conducting apparatus may show transitory interference with function attributable to expansion of air incarcerated within the eustachian tube, tympanic cavity or air spaces of the mastoid resulting in inequality of intratympanic and extratympanic air pressures. As adjustment of these air pressures occurs by venting through the eustachian tube, interference with function of the sound-conduction apparatus ceases.

Such disturbances are much more marked during rapid descent, when the discrepancy between intratympanic and extratympanic air pressure becomes very marked. Cases have been observed in which the extra-

*From the Medical Research Laboratory, Air Service, Mineola, L. I.

tympanic pressure was so great as to cause perforation of the drumhead. Practically all cases showed congestion of the drumhead following rapid descent. Occasionally the irritation and congestion resulting from rapid changes of altitude have been observed to cause acute otitis media.

Observations on the effects of altitude on the motion-sensing function of the ear have revealed nothing in the nature of obtunded ability to perceive motion or alterations in eye reactions to motion stimulus. Certain individuals showed greater inability to tolerate motion stimulus at 16,000 to 18,000 feet than they had shown at the accustomed altitude, as evidenced by the onset of nausea and vomiting. This, however, may be regarded as indicative of the onset of altitude sickness (ordinary "mountain sickness") rather than of altered vestibular function.

VII. EFFECTS OF LOW OXYGEN PRESSURE ON THE PERSONALITY OF THE AVIATOR*

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MINEOLA, L. I., N. Y.

The effects of diminished oxygen supply on the personality cannot be explained until the results of the reduction on the functions of different organs have been made known. Until this information is gathered, our views on this subjest are based to a great extent on a review of clinical data, illustrating some of the changes of temperament and character of the aviator taking place in the effort to adjust the organism to high altitudes.

Before reference is made to a few of the symptoms already noted, it is desirable to remind the reader of the fact that the problems involved in the study of any personality are not merely psychologic, but should include the biologic analysis of the reactions of the entire organism, considered as a living unit. It is extremely important that this point of view should be appreciated and accepted by the investigator. A personality study is a great deal more than a mere psychologic analysis, and often the correct interpretation of emotional and mental reactions is to be sought in the solution of some complex biologic problem.

Among the more frequent phenomena associated with reduced oxygen pressure is an increased irritability of the reflexes, particularly noticeable in very active knee-jerks. Sometimes there is a reduction of the knee-jerk, due to an apparent hypertension of the muscles and an inability to relax them. In these cases reinforcement is necessary in order to bring out the knee-jerk. This evidence of increased muscular tension in connection with the aviator is an interesting phenomenon, and deserves careful consideration. Probably impulses from the higher cortical centers are responsible for this interference with the tendon reflexes. In order to facilitate the study of these reactions it is desirable that the capacity of the aviator to relax his muscles should be tested before as well as after flying. The muscles to be tested should include those of the face, head and neck as well as the arms, legs, hands and feet. In some cases the increased tension seems to be localized. An aviator who is capable of relaxing his limb muscles may show a very tense condition of his facial muscles, or vice versa. The mental tension is reflected in many different ways. Those who suffer from the effects of reduced oxygen supply generally give some indication of this trouble in their facial expression. Varying degrees of anxiety may be represented, ranging all the way from the indefinite expression, accompanying the ill defined consciousness that some impossible task or unpleasant experience is impending, to a state of mind indicating that well formulated ideas play an important rôle in the disturbance, causing not merely apprehensiveness but also an anxiety in which intellectual processes have become active determining factors. In the indefinite states of apprehensiveness and ill defined anxiety the reactions correspond to the conditions described by the French as *angoisse*, a condition in marked contrast to the one described as *anxiété*, in which the disturbances of the higher mental responses are more strikingly in evidence than are the bulbar symptoms, marked by disorders of the circulatory, respiratory and other physiologic systems.

The occurrence of specific sensations of pain are indicative of local disorders, but the evidences of bodily and mental distress and the varying degrees of discomfort and unpleasantness evoke a variety of symptoms. Not infrequently these signs of imperfect adjustment to life in the air are intensified by conflicting trends: one a desire to continue in the Air Service and the other a consciousness of not being equal to the task. The failure of the aviator to face the dilemma squarely and settle the conflict definitely invariably leads to complications often ending in a serious loss of nerve and morale.

Mental disturbances of this character occurring as the result of lowered oxygen supply at times become sufficiently accentuated to suggest the beginning complex associated with an anxiety psychosis. In addition to the emotional disorders there is generally a very slight incoordination of the finer muscular movements, and often a marked fine tremor of the fingers and tongue.

It is interesting to note that from time to time clinicians have suspected the occurrence of some defect in the amount of oxygen supplied in connection with the various forms of anxiety neuroses. Using a form of treatment based on empiricism, attempts have been made to remedy this condition. The French clinicians for some time have recommended that oxygen be administered in these neuroses; and one or two different forms of apparatus for giving the oxygen by subcutaneous injections have been used with varying degrees of success.[1] The amount of pain accompanying the injections and the difficulty in perfecting the technic have been the chief objections to the use of this method of treatment. Heckel[1] says the method of administration that he has devised obviates these defects.

Unquestionably the administration of oxygen to a person who has been subjected to an experimental test or has ascended to a high altitude in a plane is followed by a number of interesting reactions, which have not received the attention they deserve.

We have noted that the character of the dermagraphia in a person who has been deprived of oxygen changes completely after oxygen has been inhaled for

* From the Medical Research Laboratory, Air Service, Mineola, L. I.

1. Heckel, F.: La neuroses d'angoisse, Paris, Masson & cie, 1917, p. 496.

one or two minutes. The blotching character of the red line noticeable in states of fatigue, as well as following a period of reduced oxygen supply, disappears after the inhalation, and the puckering of the skin and clear edges of the line suggest that a decided improvement in the vascular tone has taken place.

THE OCCURRENCE AND SIGNIFICANCE OF B. WELCHII IN CERTAIN WOUNDS *

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It is well known that *B. welchii* is usually very common in early wounds. Studies by Fleming[1] in 1914-1915 showed its presence in 81 per cent. of 127 wounds from one to seven days old; in 34 per cent. of fifty-six wounds of from eight to twenty days, and in 18.5 per cent. of wounds more than twenty days old. Goadby[2] presents figures for the occurrence of anaerobes in wounds, but none for the incidence of *B. welchii* in particular. He found a markedly less percentage of saccharolytic and ensporing anaerobes in excised than in nonexcised wounds. Plisson[3] found harmless persistence of *B. welchii* until the tenth day in twenty-two of 186 cases, and in three beyond the fifteenth day. Taylor[4] proved the presence of gas-forming bacilli on sequestrums in 14 per cent. of a series of wounds with sequestrums aged from forty-five to 300 days.

Taylor's figures show that *B. welchii* can occur and persist for a very long time on bone and in deep parts of wounds. Whether cultures from the exudate would be positive in these cases is a different question. Taylor considers the persistence to depend on the protection of the bacteria from the body fluids; hence it seems improbable that the bacilli would appear in the exudate taken by the usual cultural methods.

Since the observations recorded here were made partly to discover as far as possible the significance of the usual cultural examination of wounds for *B. welchii*, cultures were taken by the routine methods, which consisted in (1) taking specimens of the exudate on cotton swabs; (2) planting in recently boiled and cooled milk of neutral reaction, and (3) anaerobiosis by the pyro-soda method of Wright or by the hydrogen and palladium asbestos method. Milk is not quite so good a cultural medium for *B. welchii* as glucose bouillon, for it takes a slightly heavy inoculation to get growth. It is used, however, because it is the only practicable method of getting a characteristic culture in twenty-four hours, and hence is the usual routine test. No culture method gives growth with doses under a certain size; hence the absolute presence or absence cannot be ascertained in any event.

The points especially considered here are: (1) the occurrence of *B. welchii* (as determined by the usual culture test) in wounds at a base hospital during a quiet period when casualty clearing station treatment is thorough; (2) the occurrence of gas infection in the same series and its relation to the occurrence of *B. welchii;* (3) the persistence of *B. welchii* after gas infection, compared with its persistence in wounds in which no gas infection has occurred; (4) the value of examination for *B. welchii* in regard to the diagnosis of cases of gas infection occurring in excised wounds, and (5) the relation of *B. welchii* to suture.

THE OCCURRENCE OF B. WELCHII IN WOUNDS AFTER THOROUGH CASUALTY CLEARING STATION TREATMENT

It seemed probable that a quiet period would afford an opportunity to determine the effectiveness of casualty clearing station treatment, when at its best, in reducing the occurrence of *B. welchii* in wounds. During the time of the study, a culture was taken of each wound at the first dressing or soon after, of patients arriving at the hospital. Only wounds involving muscles were included. Trivial wounds and clean bullet wounds were eliminated. A consecutive series of 137 cases was thus obtained.

B. welchii was proved present by culture in 23 per cent. of the cases. Of nineteen wounds of one day, *B. welchii* occurred in 26 per cent. Of forty-four wounds of two days, it was found in 20 per cent.; in twenty-seven wounds of three days, in 19 per cent.; in thirty-five wounds of from four to seven days, in 25 per cent., and of four wounds of from eight to ten days, in 50 per cent. Eliminating the figures for eight to ten days as based on too few cases, the occurrence is markedly uniform in wounds of the different ages.

The occurrence of the same or a higher incidence in older cases is explicable by the fact that these patients came late to the hospital, largely because they had unusually severe wounds or had had a previous gas infection at the casualty clearing station. In view of the persistence of *B. welchii* after gas infection (described later), the incidence was calculated in wounds that had not had a previous gas infection. The incidence for wounds up to four days remained the same, but for wounds of from four to seven days it fell from 25 to 16 per cent., and for the whole series from 23 to 19 per cent.

Smear examination was done merely to obtain a rough idea of the numbers of *B. welchii* present. As a rule, only two distinctions were made: (*a*) those having no *B. welchii* or extremely few, so that a considerable search was necessary to find them; these are called negative; (*b*) those having more; these are called positive.

The incidence of cases with positive smear and culture (eliminating cases with previous gas infections) was: in one day wounds, 18 per cent.; in wounds of two days, 18.6 per cent.; in wounds of three days, 8 per cent.; in wounds of from four to seven days, 11 per cent., and in the series as a whole, 14.5 per cent.

These low percentages for the occurrence of *B. welchii* seem to indicate extremely effective previous treatment. The influence of excision at first seems to be absent, for of the cases in which excision was performed, according to the field medical card, *B. welchii* was present in 23.5 per cent., while of those not stated to be excised it was present in 19.4 per cent. The explanation lies in the fact that the more severe wounds are the ones that are excised and are also the ones in which *B. welchii* is most likely to occur. Eliminating cases with previous gas infection, the occur-

*From U. S. Army Base Hospital No. 5.

1. Fleming, Alexander: The Bacteriology of Septic Wounds, Lancet, London, 1915, **2**, 638.
2. Goadby, K.: The Bacterial Flora of War Wounds, Brit. Med. Jour., 1918, **1**, 581.
3. Plisson, L.; Ramond, and Vergelet, C.: The Bacterial Flora of War Wounds, Bull. Soc. Méd. d. Hôp. de Paris, Dec. 21, 1917, p. 1302.
4. Taylor, K.: Persistence of Bacteria within Sequestra, Ann. Surg., 1917, **66**, 522.

rence of *B. welchii* in the excised wounds is not lower than in the nonexcised. These results suggest, at least, that good judgment was used in performing excision, giving a very uniform output of cases.

Goadby's finding of a higher percentage of saccharolytic anaerobes in nonexcised than in excised wounds has only the appearance of differing from these figures. His nonexcised cases included nearly all cases at a period when excisions were little done, while his excised wounds occurred at a different period when the percentage of excisions was high. Consequently each of his series included wounds of all sorts, while in this series the nonexcised were merely the lighter wounds left over after the severe ones had been done.

INCIDENCE OF GAS INFECTION IN THE SERIES

Definite muscle gas infection after arrival occurred in the series in 2.9 per cent. of the cases. If a few slightly doubtful cases are included, the total is 5.1 per cent. Of the cases with *B. welchii* on culture, unquestionable gas infection occurred in 13 per cent.; including slightly doubtful cases, the figure becomes 22.5 per cent.

THE PERSISTENCE OF B. WELCHII IN THE WOUNDS

The cases in which *B. welchii* was found were followed, as far as possible, until the cultures became negative. Usually more than one negative examination was obtained. Besides the cases in this series, records are included from a previous series of 200 nonconsecutive cases.

In the cases without gas infection, a fairly marked change from positive to negative was evident by the eighth day of the wound. Before this, 30 per cent. had become negative; but after this day, only 17 per cent. remained positive, and these for a short time, as a rule.

Of the cases with gas infection, the period of change from positive to negative cultures was not evident until about the twelfth day of the wound; before this, only 12 per cent. had become negative; while afterward, 36 per cent. remained positive.

Thus there is evidently a greater tendency for the persistence of *B. welchii* in wounds having muscle infection. This is in spite of the fact that each case of gas infection had thorough removal of débris and excision, and in each case the symptoms of an active infection stopped immediately after the operation. Even if the reckoning is made from the time of the operation as a starting point, the period of change comes on the tenth or eleventh day. The persistence was remarkable on casual observation before the figures were obtained.

A persistence in noticeable numbers in smears occurred in the gas infection series until about the eighth day of the wound. There seemed to be a fairly regular diminution in numbers until the eighth day, and 43 per cent. had become negative by that time, while 20 per cent. remained positive beyond the eighth day. In the cases without gas infection, more than 75 per cent. had become negative before the eighth day, and only 15 per cent. remained positive beyond it.

These figures indicate the tendency to persist longer in moderate numbers when a gas infection has preexisted. In fact, in wounds without gas infection the tendency is strong for bacilli to become very few early in the history of the wound. Half of the smears had become negative by the fifth day, while by that time only 18 per cent. had become negative on culture. Of the gas-infected cases, however, only 12 per cent. of the smears had become negative by the fifth day, and none by culture.

These results suggest that *B. welchii* does not flourish long in surface exudate. The time of persistence in gas infection cases, with the gradual diminution in numbers, suggests either foci of infection, gradually overcome, superficial growth in the exudate, or a gradual exudation of the bacteria from the previously infected tissues. Local foci of active infection seem extremely unlikely in view of the thorough operation in each case, and the entire absence of clinical evidence of infection. A superficial growth in the exudate might account for the early persistence in considerable numbers; but the long, late persistence in numbers practically imperceptible in the smear suggests rather gradual riddance of the bacteria from the infected muscle. Such a process would also account for the large numbers soon after operation. Pathologic studies show the presence of *B. welchii* beyond the area of apparent infection, and it is often easy in cases of heavily infected wounds to demonstrate the passage of bacteria from within the infected wall.

The marked tendency to early dying out in numbers in cases not infected is additional evidence of the difficulty of the continued growth of *B. welchii* in surface exudate in open wounds. There are always a certain number of cases of slight local gas infections which are not noted clinically. It seems probable that this must account for a certain number of the instances of persistence in the cases classified as not infected. This makes the probable true persistence in moderate numbers very small. The later persistence in very small numbers is probably to be explained by the presence of small foci, such as pockets, in which favorable anaerobic conditions are obtained; it is most noticeable in very large wounds which are apparently quite open, but in which, on account of the magnitude of operation, it is difficult to carry out a complete excision or removal of débris.

THE VALUE OF EXAMINATION FOR B. WELCHII

It is apparent on examination of the slides that in cases of active gas infection, bacilli are usually present in much larger numbers than in wounds of the same age without gas infection. Thus, of the wounds of from one to three days with *B. welchii* on culture but without gas infection, 40 per cent. showed negative smears; 46 per cent showed very moderate numbers, and only 4 per cent. showed fairly large numbers. Of the gas-infected cases (twenty in number), 5 per cent. showed negative smears, 40 per cent. moderate numbers, and 55 per cent. large numbers. Thus the finding of large numbers of *B. welchii* in well excised wounds of from one to three days seems strong presumptive evidence of active gas infection. (It may be remarked that of these particular gas-infected wounds, practically all had been excised.) The older the wound, the stronger the evidence.

If the cultures are positive but the smears negative, or if the cultures are negative, it is somewhat strong evidence against gas infection. It is not at all conclusive evidence, for in certain cases of gas infection, *B. welchii* may be absent altogether. In other cases, in which *B. welchii* is a factor, the infection may begin about a foreign body deep in the wound and the culture be negative. It does not seem likely that these cases make as much as one fifth of the cases of gas infection.

If moderate numbers occur, the evidence is of little more value than is obtained by culture alone.

The presence by culture alone reduces the chances from 1:30 against a given wound in this series being gas infected to 1:7, and hence is so slight evidence as to be hardly worth considering.

It should be emphasized that these figures apply only to wounds of the special character described. It seems probable that in wounds before excision or when excision is not carefully done, neither smear nor culture can afford very valuable evidence on account of the common occurrence of *B. welchii*.

RELATION TO SUTURE

Of nine cases with *B. welchii* on culture at time of suture, two were failures, developing gas infection, and one a part failure. Of the remainder, *B. welchii* persisted, with positive smears, harmlessly for various periods after the suture; in two cases it persisted for three days; in one, for four days, and in two, from one to two days. One case of positive culture was obtained five days after suture. The two cases of failure were in wounds of from one to two days, and large numbers of *B. welchii* were present in each case. In no successful case were more than very moderate numbers present at the time of suture. As far as the evidence of this small number of cases goes, it does not seem that the mere presence of *B. welchii* is a contraindication for suture, but that its presence in large numbers is. In none of the cases were streptococci present. The significance of the presence of *B. welchii* may be entirely different when associated with various organisms.

SUMMARY AND CONCLUSIONS

1. In a consecutive series of 137 wounds aged from one to eleven days, in patients arriving at a base hospital during a quiet period after thorough casualty clearing station treatment, *B. welchii* was obtained by culture in 23 per cent. Cases with more than extremely few *B. welchii* organisms on smear made 14 per cent. of the series. These figures are much lower than for wounds during rush periods, or for wounds before excision was common.

2. The small difference in the occurrence of *B. welchii* in the series in the excised, compared with the nonexcised, is due to good judgment in excising especially the wounds in which *B. welchii* is most apt to be present.

3. Definite muscle gas infection occurred in 2.9 per cent. of the series. Including slightly doubtful cases, the incidence is 5.1 per cent. Of the cases with *B. welchii* on culture, the cases with unquestionable infection number 13 per cent., and including the slightly doubtful cases, 22.5 per cent.

4. For further studies, cases of gas infection were included from a previous nonconsecutive series. These cases were practically all in excised wounds. It was found that the cultures for *B. welchii* tend to become negative by the eighth day when no gas infection has occurred, but to last until the twelfth day or later in the cases with gas infection. Even reckoning the day of operation as the starting point, persistence is distinctly greater in the gas-infected wounds. This is in spite of complete lack of evidence of active infection after the thorough operation performed in each case.

5. There is a definite tendency to persist in greater numbers until the eighth day in the gas-infected cases than in those not infected.

6. In cases without gas infection, the numbers of bacilli tended to become very small early in the history of the wound.

7. The results suggest that *B. welchii* does not flourish long in surface exudate. Persistence in cases without gas infection is probably due largely to previously unrecognized local infection, or to small anaerobic foci in large wounds in which a thorough excision was impracticable. The persistence after gas infection may be explained by a gradual riddance of the bacilli from invaded but not definitely altered tissues.

8. In wounds of the character of this series, the presence of *B. welchii* in large numbers is good evidence of an active gas infection. The evidence is stronger, the older the wound. Its absence is strong but not conclusive evidence of lack of infection, for negative cultures are occasionally obtained when *B. welchii* is not a factor in the infection, or when the infection begins deep about a foreign body.

9. If moderate numbers of *B. welchii* are present, the evidence is of about the same value as is given by culture alone. The value of culture alone is so slight as scarcely to be worth considering.

These facts with regard to the value of smear and culture with reference to the diagnosis of gas infection in these wounds appear to rest on the inability of *B. welchii* to grow luxuriantly for a long period on the surface of surgically cleaned wounds, thus preventing the occurrence of large numbers when no infection is present; and on the occurrence of large numbers of *B. welchii* in the exuded serum of the infected cases, thus causing the highly positive smears.

10. The statements made here probably do not apply to wounds that have not had thorough previous surgical treatment.

11. The presence of *B. welchii* in large numbers was a contraindication to sutures in the small series observed. Its presence in small numbers is not necessarily a contraindication. There are points here in connection with the association of bacteria that need investigation. *B. welchii* may persist harmlessly as long as five days after suture.

"Team Work" by the Medical Profession.—In a summary of that portion of the Cavendish lecture by Sir Bertrand Dawson relating to the future of the medical profession, the *Medical Officer* quotes him as having said that the growth of knowledge makes measures for the prevention and cure of disease more and more complex, so that the full exercise of these powers no longer lies within the scope of individual effort but requires for its accomplishment well organized "team work." In the future, investigation will become more and more technical and collective treatment correspondingly specialized. This renders the patient's home less suited for his treatment and the need for institutional facilities all the greater. Sketching the scheme which he would consider best for fostering a closer union between the health organization of the community and the intellectual and professional life of the doctors, he said that the nucleus of this system of medical service would be the hospital. Local hospitals and clinics would be grouped in relation to central and teaching hospitals in the larger towns, and there would be corresponding relationship between the local practitioner and the consultant of the district. From this it would follow that the practitioner's source of income would be more in the nature of a salary than of fees, but this would not mean the extinction of private practice. A full-time salaried service for all medical men he regarded as detrimental to the best interests of both doctor and patient, for medicine stereotyped under such a system would become a "soulless machine."

BLOOD TRANSFUSION AT THE FRONT AREA *

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This paper is based on observations of transfusions of blood performed at advanced hospitals. The patients were those having but little prospect of recovery otherwise.

Donors.—Arrangements were made through the medical officer, with the sergeant in charge of the walking wounded, to supply lightly wounded men for donors. As the occasion required, those selected were sent to the resuscitation ward for grouping and charting. A grouped list of all donors was available at a minute's notice, day or night. A list of about ten donors, usually assigned to light duty around nearby wards, was kept at all times. As economy we used Group II, III and IV men. Some casualty clearing stations use only Group IV donors, and do not group

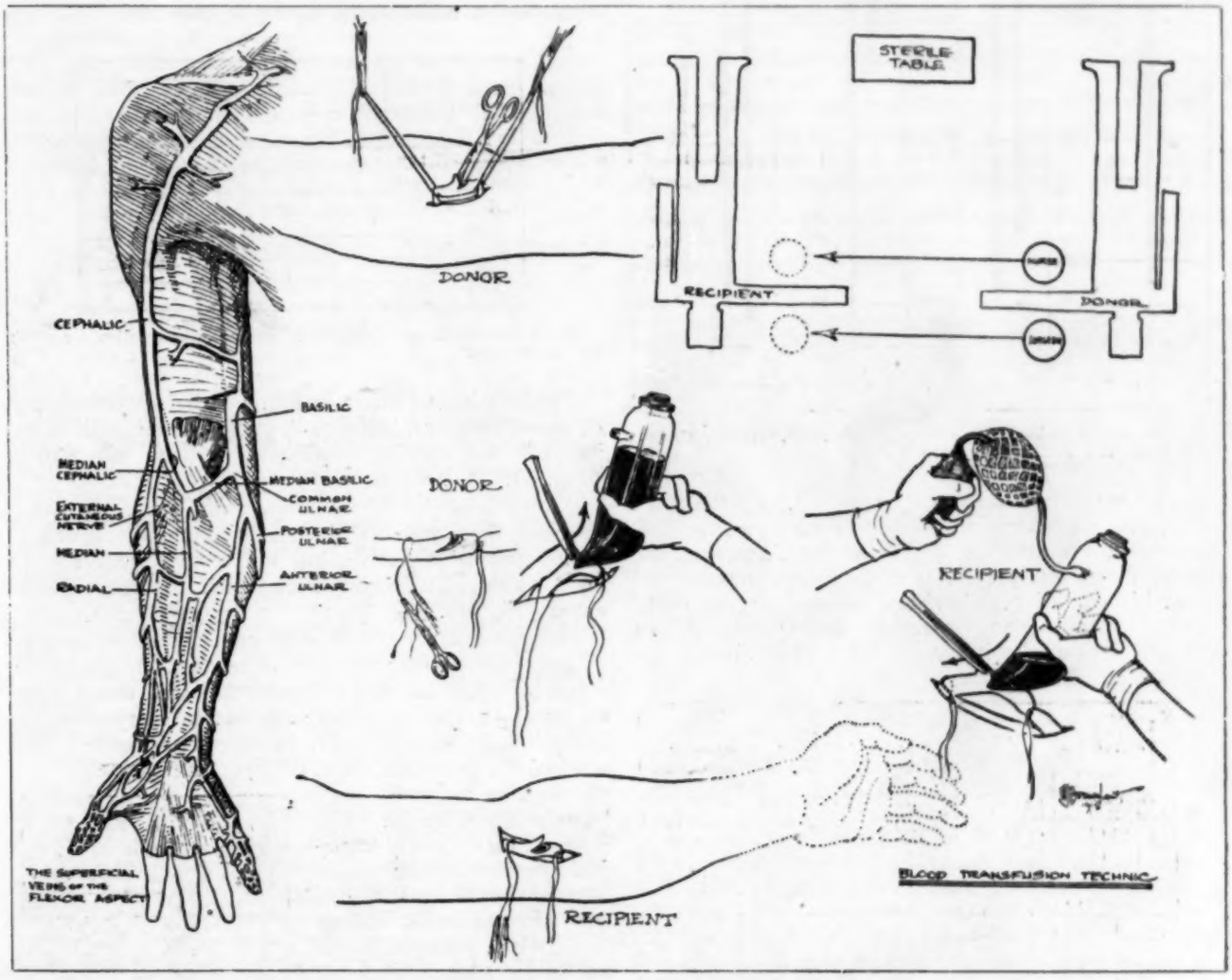

Fig. 1.—Technic of blood transfusion.

their patients; however, we found that it required about ten minutes to group a patient, and thus, we were able to use all donors excepting the group I men.

Grouping.—The selection of donors and the grouping of recipients was done by the method described by Lee,[1] with serums and necessary equipment furnished by Captain Karsner.[2] By holding the slide over a candle, the reactions were judged with the naked eye. All cases were classified without difficulty. The technic was so simple that it could be carried out in the resuscitation ward, proving very practical from all points of view.

Technic of Transfusion.—The indirect method of transfusion was used, with the technic as shown in Figure 1. The tubes were coated with ordinary hard paraffin obtained from the pharmacy at the casualty clearing station.

A vein of the flexor aspect of the arm was used, 3 c.c. of 1 per cent. procain being used for infiltration anesthesia. The proximal end of the donor's vein was tied, and the distal end of the recipient's, a ligature loop being placed around the distal end of the donor's vein and the proximal end of the recipient's. Traction by means of a hemostat closed the veins.

* From No. 9 (Lakeside, U. S. Army) General Hospital.

1. Lee, R. I.: A Simple and Rapid Method for the Selection of Suitable Donors for Transfusion by the Determination of Blood Groups, British Medical Journal, 1917, **2**, 684.

2. Karsner, H. T.: Transfusion with Tested Bloods, Including the Grouping of One Thousand Bloods and a Method for Use at Advanced Hospitals, THE JOURNAL A. M. A., March 16, 1918, p. 769.

In our series of cases, there was not an instance of coagulation in the tube. The average time for filling each tube of 300 c.c. capacity was three minutes; for the entire transfusion, approximately thirty minutes.

Differential Diagnosis—Hemorrhage and Shock.—From a clinical point of view, it is very difficult, in some cases, to know whether a patient is suffering from

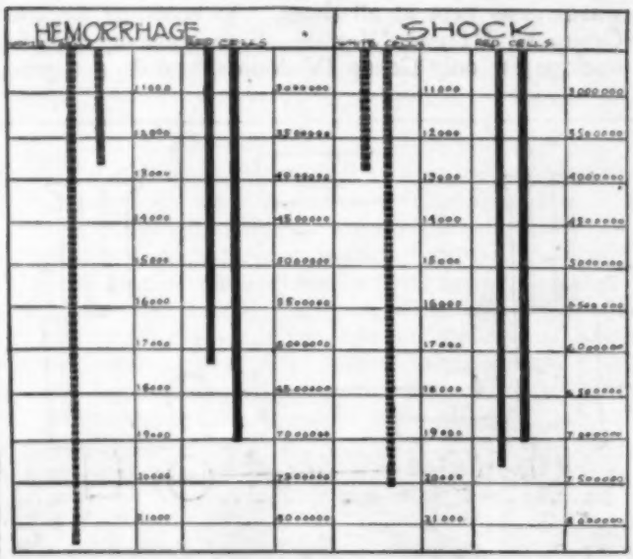

Fig. 2.—Blood counts in shock and hemorrhage. (Crile, G. W.: Hemorrhage and Transfusion, p. 111.)

hemorrhage, from shock, or from both. In the three conditions, the pulse, the blood pressure and the collapse are not dissimilar. In hemorrhage, however, the patient is generally restless and anxious or worried about his condition. A shock patient, on the other hand, is inclined to be listless and apathetic. In extreme cases of shock, the patient is almost invariably

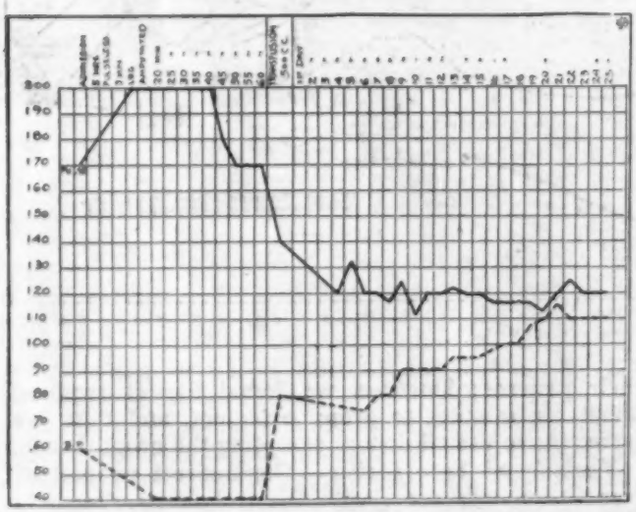

Fig. 3.—Curve of pulse and blood pressure in transfusion for hemorrhage.

of a grayish-blue color, this symptom being attributed by Crile to a failure of internal respiration.

As a practical measure, I would suggest that a note be made on the field card by the medical officer at the field ambulance, indicating the amount of hemorrhage.

Increase of White Blood Cells in Hemorrhage.—In hemorrhage, we found a definite increase in the white blood count, confirming the observation of Crile.[3] However, our series showed a blood count, in severe cases, amunting to 45,000. In shock, on the other hand, we found no increase in the white blood count. Nearly all our cases were examined under eight hours after injury (Fig. 2).

Transfusion for Hemorrhage.—In acute hemorrhage, transfusion of blood is specific, provided the patient has not been in an exsanguinated state long enough to cause irreparable injury to the brain. The effects generally are striking, immediate and permanent. In our series, we had only one case in which transfusion was useless, owing to this fact.

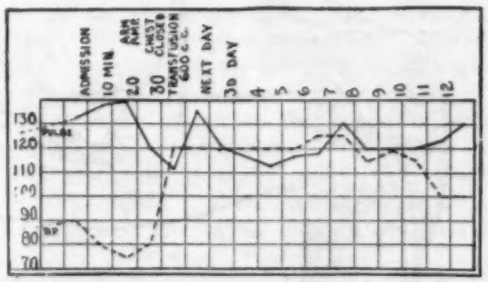

Fig. 4.—Curve of pulse and blood pressure in transfusion for shock and hemorrhage.

Transfusion of blood is followed by a marked rise of blood pressure, increase in pulse volume with slowing of rate, while respiration returns to normal (Fig. 3).

Transfusion for Hemorrhage and Shock.—In cases in which there was both hemorrhage and shock, transfusion proved effective, but the results were not as good as those following transfusion for hemorrhage alone (Fig. 4).

Transfusion for Shock.—In shock without hemorrhage, if the patient had not yet reached the gray-blue stage, a certain amount of benefit followed transfusion of blood—a change often sufficient to carry through operation to recovery. If, however, the patient had reached the gray-blue stage, no benefit resulted from transfusion (Fig. 5).

In a series of fifty transfusions, in cases in which recovery by the usual course was not expected, 55 per cent. of the patients recovered. Two of the patients died of pneumonia. In several, with gunshot wounds of the abdomen, transfusion was of no avail. In a few of the most severe cases of gunshot wounds of the abdomen we gave 200 c.c. of blood three days in succession, following the primary transfusion. However, this treatment showed no more improvement than in those cases in which transfusion was performed at one séance, provided sufficient blood had been given at the primary transfusion.

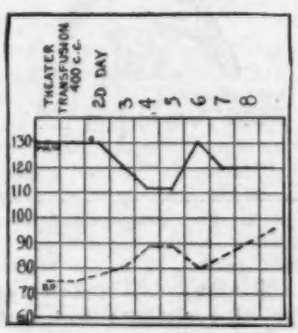

Fig. 5.—Curve of pulse and blood pressure in transfusion for shock.

Only once was there a slight reaction. This man underwent transfusion for hemorrhage from a severed

3. Crile, G. W.: Hemorrhage and Transfusion, New York, D. Appleton & Co., 1909, p. 111.

popliteal artery. Fourteen days later the leg was amputated. A severe hemorrhage followed the operation, so that the man was again transfused. On the third day, a slight rash, not unlike serum rash, had developed, accompanied by a temperature of 101 F. The following day the temperature was down to normal, and the rash cleared up without further disturbance.

CONCLUSIONS

1. Timely blood transfusion for hemorrhage is a specific cure.
2. For hemorrhage and shock, results are good, but not specific.
3. For pure shock early transfusion, that is, transfusion before the "gray-blue" stage is reached, is useful, and is the most efficient treatment. Transfusion in the gray-blue stage is of little use. In this class, no other treatment has been useful.

FURTHER EXPERIENCE WITH FACE MASKS *

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When the Durand Hospital of the John McCormick Institute for Infectious Diseases was opened, rigid aseptic technic was adopted and the nurses were specially instructed in measures calculated to protect them from infections. From March 12, 1913, to Nov. 1, 1914, nine out of sixty-nine nurses, or 13 per cent., acquired clinical diphtheria. From this time on, all nurses giving a positive Schick test were immunized with diphtheria antitoxin. This practically eliminated active diphtheria; but from Nov. 1, 1914, to June 1, 1916, weekly throat cultures disclosed ten diphtheria bacillus carriers among forty-three nurses, or 23.25 per cent.

Up to June 1, 1916, nine cases of scarlet fever occurred among 112 nurses who were on duty, or in 8 per cent.

As we were unable to explain so many instances of infection through faulty technic, an effort was made to eliminate a possible factor of danger that had previously been largely ignored, namely, infection through mouth spray. Since June 1, 1916, gauze masks have been used by the nurses, and up to Oct. 1, 1918, six diphtheria bacillus carriers have been detected among seventy-three nurses, or 5.2 per cent.[1] No case of scarlet fever has occurred since masks were worn. The nurses are instructed to change the mask as soon as it has been known to be grossly contaminated, and never to put the hands to the mask to adjust it, etc., until the hands have been thoroughly washed.

Early in 1918, bacteriologic tests showed that the masks we were using did not remove all the bacteria thrown out in mouth spray. The masks consisted of two layers of gauze, 28 by 24 mesh; but as they were worn only once before washing and resterilizing, shrinkage soon made the openings in the gauze much closer than they were in the new masks.

Studies were instituted to learn how the masks could be made most efficient. The results that we have obtained agree very well with those recently reported by Haller and Colwell[2] and Doust and Lyon.[3] They are here presented as serving further to emphasize the importance of gauze masks of proper composition. When the probable importance of droplet infection in the dissemination of human tuberculosis attracted attention, gauze masks to be worn by the patient were advocated. Hamilton, in 1905, advised the use of gauze masks to cover the mouth of patients with scarlet fever when there were severe streptococcal complications and when the individual could not be properly isolated. In 1916, Meltzer advocated the use of a fine mesh net over the faces of patients with infantile paralysis and also over the faces of attendants. Various mechanical protections of the face were formerly used by physicians when swabbing throats and doing tracheotomy in cases of diphtheria. Gauze masks have been long used by many surgeons and their assistants with the purpose of protecting wounds from infection by mouth droplets.

Durand hospital mask, devised by Miss Charlotte Johnson, superintendent: The gauze (44 by 40 mesh) is cut 8 inches wide and 23 inches long. The sides and one end are turned down one-quarter inch. It is folded twice, the unturned end first, making a 7½-inch square. The opposite diagonal corners are cut off 1 inch and the raw edge is turned in one-half inch. It is stitched firmly all around. A 1-inch dart 1½ inches long is taken up at the middle of each side of the mask. A 14-inch tape is sewed on the opposite uncut corners. This mask has the advantage of covering the nose and mouth and in making the traction on the chin and not drawing on the nose and lips.

Our experiments were performed in a quiet room with no currents of air. It was assumed that the power of various gauzes to filter moist spray from air would increase with closeness of mesh and with the number of layers employed. In the first tests a spray of carbolfuchsin was employed, the dye being susceptible of fairly accurate measurements. It was thrown as spray by a hand atomizer. Briefly, these tests showed that the percentage of fuchsin passing through the gauze becomes progressively less as the mesh of the gauze becomes closer and as the numbers of layers of gauze is multiplied.

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* From the John McCormick Institute for Infectious Diseases.

1. Our experiences up to Dec. 1, 1917, were reported by Weaver, G. H.: The Value of the Face Mask and Other Measures in Prevention of Diphtheria, Meningitis, Pneumonia, etc., THE JOURNAL A. M. A., Jan. 12, 1918, p. 76.

2. Haller, D. A., and Colwell, R. C.: The Protective Qualities of the Gauze Face Mask, THE JOURNAL A. M. A., Oct. 12, 1918, p. 1213.

3. Doust, B. C., and Lyon, A. B.: Face Masks in Infections of the Respiratory Tract, THE JOURNAL A. M. A., Oct. 12, 1918, p. 1216.

Similar tests were made by throwing a spray of a suspension of *Bacillus prodigiosus* in salt solution against gauze and estimating the number of colonies developing on plates exposed on the opposite side. It was found that the number of colonies became progressively less as the mesh of the gauze became finer and as the number of layers of gauze increased. It was noted that at a distance of from 3 to 5 feet from the spray, the proportion of the bacteria reaching that point which passed through the gauze barriers was greater than at shorter or greater distances. This is probably to be explained by the more rapid precipitation of the larger particles as regards the nearer distances and by the failing force at greater distances. These results demonstrated that gauze will remove bacteria from air when carried in a moist spray. The efficiency of the gauze as a filter is in direct ratio to the fineness of mesh and the number of layers used.

Further tests were now made to determine the efficiency of gauzes of various meshes and in different numbers of layers as filters for mouth spray. A suitable subject for these tests was found in an adult who was affected by a chronic antrum and ethmoid suppuration with constant purulent discharge, in whose throat and mouth *Streptococcus viridans* in abundance was constantly present. It was found that a mouth spray very rich in bacteria was discharged by this patient when the cheeks were distended with air and then, the lips being suddenly opened a little, the air was forced out with an explosive puff. The spray produced in this way was more abundant than that following coughing, and the driving force was greater, thus furnishing a very severe test as to the filtering power of obstructing gauze. Tests were made by having the patient direct such forcible expiratory efforts toward vertically placed Petri dishes containing blood agar at a distance of 6 inches, the face being uncovered and covered by various gauzes in different multiples. The results shown in Table 1 were obtained on a day when the streptococci were especially abundant. The colonies developing on the plates after twenty-four hours in the incubator were practically all of *Streptococcus viridans*. It will be noted that the coarser gauze allowed a large proportion of the bacteria to pass through, even when six layers were interposed. On the contrary, the finer gauzes removed many more of the bacteria, and when six and eight layers were used, almost all the bacteria were held back.

TABLE 1.—NUMBER OF COLONIES OF STREPTOCOCCUS VIRIDANS DEVELOPING ON BLOOD-AGAR PLATES EXPOSED AT 6 INCHES TO TWO EXPLOSIVE EXPIRATORY EFFORTS IN WHICH THE CHEEKS WERE FIRST DISTENDED WITH AIR AND THEN THE LIPS FORCED SLIGHTLY APART WITH A PUFF

Number of Layers of Gauze	Mesh of Gauze									
	20 by 14		24 by 20		28 by 24		32 by 28		44 by 40	
	No.	%	No.	%	No.	%	No.	%	No.	%
0	2,000	...	2,000	...	2,000	..	2,000	..	2,000	..
1	2,000	100	2,000	100	1,500	75	1,500	75	1,500	75
2	1,500	75	1,500	75	1,500	75	800	40	800	40
4	800	40	800	40	1,000	50	500	25	80	4
6	500	25	200	10	50	2.5	5	0.25	0	0.0
8	100	5	15	0.75	0	0.0	1	0.05	0	0.0

Similar results were secured when a culture of *B. prodigiosus* had been smeared on the pharynx and tongue shortly before the test; in this case only the colonies of *B. prodigiosus* were counted.

TABLE 2.—NUMBER OF COLONIES OF STREPTOCOCCUS VIRIDANS DEVELOPING ON BLOOD-AGAR PLATES WHEN EXPOSED TO TWO EXPLOSIVE COUGHS WITH LIPS SLIGHTLY PARTED

Distance from Mouth to Plate	No. Gauze	Three Layers of Gauze (44 by 40)		Colonies	Per Cent. Passing Through	Per Cent. Excluded
		Over Face	Over Plate			
6 inches.....	+	....	....	150	....	....
6 inches.....	....	+	....	20	13.3	86.7
6 inches.....	....	....	+	16	10.6	89.4
1 foot.....	+	....	....	150	....	....
1 foot.....	....	+	....	8	5.3	94.7
1 foot.....	....	....	+	12	8.0	92.0
2 feet.....	+	....	....	2	....	....
2 feet.....	....	+	....	1	50.0	50.0
2 feet.....	....	....	+	1	50.0	50.0
3 feet.....	+	....	....	1	....	....
3 feet.....	....	+	....	0	0.0	100.0
3 feet.....	....	....	+	0	0.0	100.0

There appeared to be no appreciable difference between dry and moist gauze in filtering properties. Since three or four layers of gauze with a mesh of 44 by 40 removed most of the bacterial spray thrown with unusual force at a short distance, further tests were carried out to learn how efficient as filters of mouth spray three layers of this gauze would be when placed over the mouth of the person discharging the spray and over the exposed plate at varying distances, corresponding to the face of the person in the neighborhood. The plates were placed vertically as in the preceding experiment. The expiratory effort consisted of two strong coughs with the lips slightly parted.

Tables 2 and 3 show the results of two such experiments, similar ones with slight variation being secured many times. The same person served in these tests as those reported above. When the gauze mask was over the face, very few colonies developed in the plates. When the gauze was over the plates, the proportion of colonies as compared to unobstructed plates was also small, but slightly larger because here the

TABLE 3.—NUMBER OF COLONIES OF BACILLUS PRODIGIOSUS DEVELOPING ON AGAR PLATES WHEN EXPOSED TO TWO EXPLOSIVE COUGHS WITH LIPS SLIGHTLY PARTED, THE PHARYNX AND TONGUE BEING PREVIOUSLY SMEARED WITH A CULTURE OF BACILLUS PRODIGIOSUS

Distance from Mouth to Plate	No. Gauze	Three Layers of Gauze (44 by 40)		Colonies	Per Cent. Passing Through	Per Cent. Excluded
		Over Face	Over Plate			
6 inches.....	+	....	....	35	....	....
6 inches.....	....	+	....	0	0.0	100.0
6 inches.....	....	....	+	1	2.9	97.1
1 foot.....	+	....	....	32	....	....
1 foot.....	....	+	....	1	3.1	96.9
1 foot.....	....	....	+	1	3.1	96.9
2 feet.....	+	....	....	9	....	....
2 feet.....	....	+	....	2	22.2	77.8
2 feet.....	....	....	+	1	11.1	88.9
3 feet.....	+	....	....	2	....	....
3 feet.....	....	+	....	1	50.0	50.0
3 feet.....	....	....	+	1	50.0	50.0

finer particles are dealt with. At a distance of 2 or 3 feet, relatively more of the particles reaching that distance pass through because here only very fine particles are projected. In the cases in which *B. prodigiosus* was smeared over the pharynx and tongue, fewer colonies developed in plates placed behind gauze obstruction. This is probably because the bacteria were less thoroughly distributed in the saliva. If the colonies that develop on unobstructed plates placed near the month are examined under magnification, it is noticed that many are compound colonies; and many of those that develop from the larger particles of saliva are the result of the growth of clumps of bacteria. Thus the number of bacteria removed is greater than the number of colonies would indicate. These larger particles of saliva are probably more dangerous, not only because they contain more bacteria but also because the toxic substances contained in the projected mucus may act on the mucous membrane where they lodge so as to favor the growth and penetration of the associated bacteria. Since the completion of these studies, the masks used in Durand Hospital have been made of three layers of gauze with a mesh of 44 by 40. The nurses are instructed to wear two superimposed masks, making six layers of gauze, when caring for cases of virulent infections in which secretions are abundant. The gauze that we have used is absorbent. It is probably preferable to buttercloth, which is treated to make the material nonabsorbent. Particles of mucus will adhere more quickly and firmly to the absorbent material, as the rapid removal of the water leaves a thicker and more sticky residue. So far we have been able to secure but one weave of buttercloth, about 28 by 30, and this is not as fine a mesh as is desirable. Even this is very difficult to find, most large dealers having none in stock and usually not knowing where it can be secured. In any case the dressing is removed in washing. Our experience with masks has been principally confined to their use to protect attendants on the sick from infection. They have been used not only by nurses, but also by physicians in their work while taking cultures from throats, doing intubations and examining chests. The mask on the face interferes with putting the hands to the mouth and nose, and so indirectly becomes a source of safety to the individual, whose hands are apt to be contaminated in her work and who thoughtlessly may put them to the face. We have also used masks over the faces of mothers while nursing their babies, when either one has been infected by diphtheria or has been a diphtheria carrier.

The employment of gauze masks over the face to prevent the transfer of infections to others was thoroughly worked out and practically applied by Capps[4] at Camp Grant. He used masks to prevent cross-infections in ambulances and in the admission rooms and wards of the hospital. Similar use of masks has since been generally adopted in Army and Navy camps and in many civil hospitals. The intelligent use of gauze masks and other measures may be instituted equally well in private families. Many family epidemics might be limited by such means. In all instances in which infections locate in the respiratory tract and in which the infectious agent is discharged in mouth spray, it is reasonable to protect those about the patient by masks of gauze.

The present concentration of effort to limit droplet infection should not prevent an equally energetic effort to close other channels of spread of infectious materials. The use of face masks may serve to give an unwarranted feeling of security to those employing them if they neglect the measures that prevent carriage of infectious materials through other agents. Emphasis must still be placed on proper sterilization of eating utensils, destruction of all infectious discharges, avoiding all contamination of foods, and special care regarding the washing of the hands every time the sick are handled.

4. Capps, J. A.: Measures for the Prevention and Control of Respiratory Infections in Military Camps, THE JOURNAL A. M. A., Aug. 10, 1918, p. 448.

New and Nonofficial Remedies

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION. W. A. PUCKNER, SECRETARY.

PNEUMOCOCCUS VACCINE (See N. N. R., 1918, p. 337-8).

A vaccine or "antigen" is prepared by E. C. Rosenow (THE JOURNAL, March 16, 1918, p. 759) by digesting a suspension of pneumococci at 37 C. until about 95 per cent. of the organisms have become gram-negative and the mixture is relatively nontoxic to guinea-pigs.

Actions and Uses.—(See N. N. R., 1918, p. 337-8.)

E. C. Rosenow believes that the protective power against pneumococcus infection is greater with a vaccine prepared according to his method than that of a vaccine made according to the usual method.

Eli Lilly & Co., Indianapolis.

Pneumococcus Antigen (Rosenow), Lilly.—Marketed in 5 Cc. vials, each Cc. containing 20 million partially autolyzed pneumococci.

Bacterial Examination of Green Vegetables.—Kurk (*Am. Jour. Pub. Health*, September, 1918) undertook an investigation to determine the presence of the coli-typhoid group of organisms, streptococci and anaerobic organisms on green vegetables. Samples were purchased at various stores about Chicago, one sample of watercress being obtained from a glass bowl containing water from a free lunch counter in a saloon. The culture mediums were made according to the standard methods of water examination of the American Public Health Association. Five organisms superficially resembling paratyphoid bacilli were isolated, but in no case did complete cultural and agglutination reactions determine that they belonged to this group. *B. coli* were found in twenty-two out of twenty-nine samples. Of samples from twelve stores classed as clean, eleven showed *B. coli;* of ten samples from stores classed as fair, six showed *B. coli*, and of six from dirty stores five contained *B. coli.* Streptococci were found on three samples—two from clean stores and one from a store classed as fair. *B. cloacae* were found on five samples, three from dirty stores and two from fair stores. A sample of green onions contained a great number of *B. cloacae*, as did a later sample of onions obtained from the same store. Mold spores were found on thirteen of twenty-nine samples; twenty-eight out of twenty-nine samples contained gas formers on lactose broth. The total bacterial count at 37 C. and 20 C. varied widely, the former from 6,000 to 4,300,000, and at the latter temperature from 18,000 to 25,800,000, the latter count being obtained from the sample of watercress from the saloon free lunch. Other than this the sanitary condition of the store did not seem materially to influence the bacterial count.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

535 North Dearborn Street . . . Chicago, Ill.

Cable Address . . . . "Medic, Chicago"

Subscription price . . . . . Five dollars per annum in advance

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SATURDAY, OCTOBER 26, 1918

SERUMS AND VACCINES IN INFLUENZA

With respect to serums and vaccines in influenza, there are certain simple facts and considerations that physicians will do well to keep in mind at this time. The main point to keep always in sight is that unfortunately we as yet have no specific serum or other specific means for the cure of influenza, and no specific vaccine or vaccines for its prevention. Such is the fact, all claims and propagandist statements in the newspapers and elsewhere to the contrary notwithstanding. This being the case, efforts at treatment and prevention by serums and vaccines, now hurriedly undertaken, are simply experiments in a new field, and the true value of the results cannot be predicted by any one. Indeed, the exact results can be determined if at all only after a time, in most cases probably not until the epidemic is past and all the returns fully canvassed. Consequently the physician must keep his head level and not allow himself to be led into making more promises than the facts warrant. This warning applies especially to health officers in their public relations.

As to serum treatment, the only noteworthy new method so far is the injection in severe cases of influenzal pneumonia of the serum of patients who have recovered from such pneumonia.[1] The principle of this method is rational; analogous procedures have given seemingly good results in scarlet fever and other diseases; and the results reported in influenzal pneumonia appear promising. Further trial of this treatment under proper conditions consequently seems to be warranted. It should be borne in mind, however, that McGuire and Redden[1] made their observations in the declining phase of the epidemic when the organism or organisms concerned appeared to be losing virulence. For this and other reasons the expectations as to what may be accomplished by this method must be kept within reasonable bounds. Influenza is a self-limited disease with variable complications and of variable severity in different places, thus offering great difficulties in the way of evaluation of different methods of treatment.

At least two kinds of vaccine are in use in the hope that they may have preventive effects. One consists solely of killed influenza bacilli, and it is being extensively used in the East. We have as yet no decisive figures as to its effects, but there is an impression that it may have some value. The other vaccine is a mixed vaccine of the more important bacteria in the respiratory tract in influenza, principally pneumococci, streptococci and influenza bacilli. It appears that vaccines of this nature are in extensive use, but we have no evidence that any benefit will be derived from them. To say that thousands have been vaccinated with apparently good results means nothing at all simply because we are still in the midst of the outbreak, in many places even in the earlier stages. How slender the basis for this anti-influenzal vaccination when it is considered that the real nature of influenza is still unknown! In any event, it will require many carefully elaborated and controlled observations before anything definite may be learned in regard to the effect of these vaccines, and it is probably safe to say that nothing on which to rely in the future can be learned from the indiscriminate vaccination now going on. There is, therefore, no basis on which promise of protection from vaccines may be made. They may be harmless, and they may or may not be of preventive value.

1. McGuire, L. W., and Redden, W. R.: Treatment of Influenza Pneumonia by the Use of Convalescent Human Serum: Preliminary Report, The Journal A. M. A., Oct. 19, 1918, p. 1311.

MEDICAL ASPECTS OF AVIATION

The subject of rotation tests employed in examining aviators for their sense of balance has recently been debated[1] in The Journal by the critics and the supporters. Whether or not these tests are too strict, it is at least clear that the flying men should have not only good general health, but also keen vision, quick reactions, coolness, and normal or more than normal capacity for maintaining their equilibrium.

In this issue appears a series of papers[2] showing the work that is being done to protect aviators against the effects of altitude, low barometric pressure, and deficiency of oxygen. This is a matter that has steadily increased in importance from both the medical and the military standpoints. The rapid improvements in aeroplanes under the stimulus of military needs have made it possible to carry aerial fighting to greater and greater altitudes. Speed and its equivalent, the ability to climb above the opponent, is to air fighting very much what the windward position, or weather gage,

1. Small, C. P.: Equilibrium Tests for Aviation Recruits, The Journal A. M. A., Sept. 29, 1917, p. 1078. Jones, I. H.: The Ear and Aviation, Nov. 10, 1917, p. 1607. Fridenberg, Percy: Visual Factors in Equilibration, Especially Aviation, April 6, 1918, p. 991. Parsons, R. P., and Segar, L. H.: Bárány Chair Tests and Flying Ability, April 13, 1918, p. 1064. The Bárány Tests in the Examination of Aviators, editorial, April 13, 1918, p. 1096. The Physical Qualities of Aviators, April 27, 1918, p. 1229. Bárány Chair Tests and Flying Ability, Correspondence, May 25, 1918, p. 1559; June 15, 1918, p. 1879.

2. Medical Studies in Aviation, pp. 1382-1400.

was in naval warfare in the days of sailing ships. Accordingly, even the bombing and observation planes are now able to fly for hours at altitudes of 12,000 and 15,000 feet, as they must do in crossing the enemy line; while the pursuit or battle planes fly at the enormous altitudes of 18,000 and 20,000 feet and even more. Everything depends on these hawks of the battle field, and it is they that protect their own observation planes, or in a swift swoop drop down on and destroy the observation planes of the enemy.

With the increase in the altitudes at which flying is common, there has been a corresponding increase in the development of so-called air staleness among pilots. It is particularly the most experienced aviators who succumb to this disorder and become unable to fly longer at the necessary altitude. This is, of course, a matter of the utmost military importance, as it deprives the service of its best aviators. Air staleness is a condition in some respects like the irritable heart of the overstrained soldier, or like overtraining in the athlete. To what extent such conditions are functional or neurotic or dependent on some abnormality of chemical balance is a problem that is now under active investigation both in America and in England in military hospitals for cardiac patients. Individual predisposition toward air staleness is subject to wide variations, and it is a matter of great importance, therefore, both for the avoidance of loss of life among the men in training for our air service, and for the development of the highest military efficiency among those selected, that the capacity of every candidate to withstand the effects of altitude and deficiency of oxygen should be determined.

The investigators at the Medical Research Laboratory at Mineola have found not only the theoretical but also a highly practical solution for this problem. By means of the rebreathing apparatus introduced by Henderson for this purpose, the subject breathes a closed volume of air and thus consumes the oxygen. The exhaled carbon dioxid is absorbed by alkali. By the reduction in the amount of oxygen, the subject is exposed to progressively lower tensions of oxygen, and thus to the physiologic equivalents of greater and greater altitudes until the limit of his endurance is reached.

During the low oxygen test, continuous observations are made on the arterial pressure, pulse and breathing, on the sounds and size of the heart, on alterations of vision, particularly stereoscopic and peripheral, and on the development of mental instability and muscular incoordination. The peculiar response of the cutaneous blood vessels known as the tache cérébrale (a concomitant of various nervous and cerebral diseases) likewise occurs in a considerable proportion of the men undergoing the test, and tends to indicate unsuitability.

The results obtained show that a considerable percentage of the men who pass even the exacting medical examination required by the Aviation Service are unable to withstand altitudes even as low as 10,000 feet without exhibiting such physical or mental depreciation as would seriously endanger a man piloting a plane. On the other hand, these tests reveal a small percentage of men who are naturally so resistant to low oxygen that they can withstand the equivalent of 20,000 feet or more for a half hour or longer without serious depreciation, either mental or physical. Evidently such men are specially fitted for work at high altitudes.

Nor is the usefulness of these tests ended by the enlistment and grading of the pilot. The Medical Corps is assigning to each aviation unit one or more flight surgeons, assisted by physical directors selected from among the men who were formerly trainers of college athletic teams. It is their duty to keep the aviators in as perfect physical condition as if they were so many football players. The flight surgeons are all given a special course of training at the Medical Research Laboratory of the Air Service in the physiology, or as it has now become, the medicine of altitude.

Previous investigations, such as those of the Pike's Peak Expedition,[3] have demonstrated that the acclimatization of persons living at various altitudes involves certain functional readjustments, especially an increased number of red corpuscles, a decreased alkali reserve in the blood, and a larger volume of breathing, that is, a lowered alveolar carbon dioxid. These readjustments, however, require days or even weeks to develop, and the study of the condition of aviators has demonstrated that unfortunately the brief periods during which they are exposed to low oxygen result in no appreciable degree of acclimatization. On the contrary, repeated flights at altitudes above those which the individual's unacclimatized (i. e., sea level) functional capacity can easily compensate act like repeated nervous and cardiac overstrains. If too often repeated, air staleness results, and the pilot is either incapacitated to fly at all or, if he persists, he is liable to lose consciousness in the air and fall.

The rebreathing test finds its use, therefore, as a means of diagnosis, for it now becomes possible, whenever the flight surgeon suspects that air staleness is developing in one of the men in his charge, to determine accurately the degree of overtraining. Furthermore, it appears[4] that the use of this low oxygen test may have a broader application in internal medicine as a measure of the functional power of the heart and circulation.

The application of physiologic knowledge to this problem appears likely to prove one of the most valuable contributions to the efficiency of the American Air Service.

3. Douglas, C. G.; Haldane, J. S.; Henderson, Y., and Schneider, E. C.: Physiological Observations made on Pike's Peak, Colo., with Special Reference to Adaptation to Low Barometric Pressures, Phil. Tr. Roy. Soc., London, 1913, B, 203, p. 185.

4. Whitney, J. L.: Medical Studies in Aviation, III. Cardiovascular Observations, THE JOURNAL A. M. A., this issue, p. 1389.

THE CONGENIAL CALORIES OF THE CANDY SHOP

At a time when conservation of foodstuffs, and especially of sugar, is one of the vital necessities of our country and the fundamental duty of every one of us, the soda-guzzling youngsters and the candy-nibbling matinée followers are properly looked on with suspicion. There is no doubt that before the war our consumption of soda water, ice cream and confectionery was growing at a rapid rate, and there is every reason to believe that when the restrictions are removed and the prices abate, these typically American habits will continue as before, or increase. Just how large an amount of nutriment is taken in this way by many people is probably not generally appreciated, and formerly we had no definite information on which to base an estimate. This has now been furnished in a reliable and exact form from the Nutrition Laboratory of the Carnegie Institution.[1] By aid of the method of direct determination of the heat of combustion in the calorimetric bomb, the total calories furnished by numerous popular sweets and beverages have been ascertained. These analyses reveal that an ordinary six-cent (war price) bar of sweet chocolate will furnish ordinarily 200 or 300 calories. Taking most of these chocolate candies sold in bar form, whether sweet, milk or nut chocolate, ten cents will purchase as high as 735 calories in some brands, ordinarily from 300 to 600 calories, and in only a few cases less than 200 calories. As 500 calories is nearly one third of the basal caloric requirement of normal man, and may represent from one fifth to one sixth of the total daily requirements of the average man not at severe muscular labor, a bar of chocolate candy, or its equivalent from the bonbon box, means a very considerable addition to the food supply which is usually a between-meals addition that does not materially curtail the food eaten at each meal. No wonder there are so many fat women at the matinée.

America's most prominent inventions in the line of beverages are undoubtedly the cocktail and the ice cream soda. What amount of fire the former provides, the Benedicts do not state; probably the calorimetric bomb could not do it justice anyway, for a calorimetric bomb is a soulless thing, without a particle of poetry or imagination. But a cold and clammy ice cream soda apparently digests readily in the alimentary apparatus of the bomb, and registers from 202 to 467 calories, depending on the liberality of the soda clerk. There seems to be some honesty in the soda trade, for the fifteen centers give more calories than the ten centers. The "sundaes" or "college ices" furnish a large fraction of a full meal, yielding generally from 300 to 500 calories. When you order a nut sundae you get from 4 to 6 gm. of protein to help balance the ration. And the children's favorite, the ice cream cone, comes through with about 100 calories for a nickel. So it isn't surprising or undesirable if Willie doesn't eat all of his dinner when he has had two ice cream cones, a bar of chocolate almonds and an ice cream soda. He has had about a thousand calories in the mess, which is about one third as many calories as father needs for a day's work.

Even the simpler beverages furnish numerous calories. Ginger ale gives about 150 calories to the pint, and grape juice about twice as much. The plain vanilla or chocolate soda without cream averages about 200 calories. Ordinary "crackers" furnish about 4.5 to 5 calories per gram, which means that the usual soda cracker gives about 30 calories, or about one-tenth to one-fifteenth as much as ten cents' worth of chocolate candy, although it does provide much more protein. So the afternoon tea, with candies and fancy crackers, furnishes not a few calories, usually to people who do not seem to need them very much. At a boys' school it was found that the between-meals candies, sodas, etc., amounted to about 640 calories, which is a mere trifle in the nutrition of the adolescent male. We are tantalized by the statement that at Vassar these extras totaled 10 per cent. of the daily intake—we long for the details. Physicians will see in these figures reason for careful inquiry into the sweet-tooth requirements of his patients, as well as the meal-time consumption of foods—especially in the fat ones.

1. Benedict, Cornelia G., and Benedict, F. G.: The Energy Content of Extra Foods, Boston Med. and Surg. Jour., 1918, **179**, 153.

PEANUTS AND SOY BEANS AS HUMAN FOODS

The evolution of food products from animal sources—the production of meat, milk, eggs, pork, bacon, poultry, etc.—involves the conversion of plant products, many of which may serve directly as human nutriment. This transformation of cereals, for example, into meat and milk, is an expensive one from the standpoint of the energy exchange that is necessitated. To build up one pound of food in the form of animal tissues calls for the feeding of many pounds of nutrients from plant sources. It has therefore become a serious problem in the face of a possible shortage to determine to what extent it is permissible, not to say profitable, to convert edible cereals into animal products prior to using them rather than to consume the corn, barley, wheat, etc., directly in the human ration. Milk must be had at all events; but it seems probable that both Americans and Europeans will tend more and more in the next few years to displace meat and related animal food materials to a considerable degree with vegetable foods. The trend toward a more extensively vegetarian regimen is almost certain to follow as a consequence of the altered conditions of animal husbandry enforced by the high cost of feeds.

The prospect thus presented brings the cereals into prominence at once. Among a large group of the pop-

ulation in France, bread constitutes more than half of the energy intake per day. The cereals are essentially alike in being comparatively low in their content of protein as contrasted with animal foods. Any plan to supplant the latter to any extent in the dietary therefore calls for the introduction of products from vegetable sources that can be classed as protein-rich. These must be available to supplement in some degree the already indispensable cereals, just as meats and other animal foods do at present.

The protein problem is not, however, merely a quantitative one. There is considerable justification for the belief that the proteins supplied by meat, eggs and milk are of high biologic value. In replacing them as the status of the pocketbook and the economics of agriculture seem to demand, attention must be centered on the possibility of securing proteins that represent a suitable amino-acid make-up, the nutritive significance of which has repeatedly been pointed out in THE JOURNAL. The legumes, particularly the ordinary garden peas and beans, come foremost into mind as protein-rich vegetable food materials. But there is no lack of evidence to show that while the proteins of the more widely used legumes are quite well utilized by the human body, comparing very favorably in this respect with the cereal proteins, they are not as completely utilized as the proteins supplied by such animal foods as meats, eggs and milk.

Two leguminous seeds have lately made better claims for more popular recognition in human nutrition. The soy bean has been a staple for generations among the people of China and Japan. It forms a prominent source of protein in their diet, supplementing rice, which is so extensively used and contains a great excess of carbohydrates. These people keep few live stock and eat little meat. Apparently they believe it is the part of economy to eat vegetables rather than to feed them to animals and then eat the animals. In this country a beginning in the use of soy beans in the human dietary has scarcely yet been made. The second legume, the peanut, is popularly known, though its prominence dates back to scarcely more than half a century. It is eaten in a casual way, rather than as a staple in the diet; and it would not be difficult to gather "impressions" as to the poor digestibility of the peanut.

We have already presented some reasons for believing that both the soy bean and the peanut may represent unusually desirable sources of protein. In reporting the feeding experiments of Osborne and Mendel[1] and Daniels and collaborators,[2] the favorable prospect offered by an increased use of both products was intimated. Further studies conducted by Johns and his co-workers at the Bureau of Chemistry in Washington show that from both soy beans and peanuts it is possible to isolate a liberal quantity of proteins relatively rich in their yield of the amino-acids lysin and tryptophan—a partial index of presumable nutritive superiority.

An added test of dietary value—that of digestibility—has been furnished anew by the Office of Home Economics in the United States Department of Agriculture. Holmes[3] has conducted this investigation on men in whose diet soy bean and peanut flours contributed a liberal proportion of the entire protein intake. They were eaten in the form of a well-known type of "quick bread" or "biscuit" as a part of a simple mixed diet. None of the subjects reported any digestive or other physiologic disturbances. Holmes is justified in believing that the figures, 85 per cent. for the digestibility of soy bean protein and 86 per cent. for the digestibility of peanut protein, indicate a very satisfactory utilization of these proteins by the human body. No attempt was made to ascertain the limit of tolerance for soy bean and peanut flours when included in a simple mixed diet; but since in seven experiments with soy beans the subjects ate an average of 70 gm. daily of soy bean protein, and in four experiments with peanut flour the subjects ate an average of 65 gm. of peanut protein daily without any observed symptoms of physiologic disturbance, it should be evident that these proteins are tolerated by the human body in amounts in excess of those that are likely to be found in the ordinary mixed diet. At any rate, the figures obtained for the digestibility of the proteins supplied by soy bean and peanut press-cake flours compare favorably with those obtained for cereal proteins, and are somewhat higher than those obtained for some other legume proteins. Perhaps, therefore, we shall not go amiss for the present in classing dietary articles suitably prepared from either the soy bean or the peanut as substitutes for both wheat and meat. The success of such substitution, however, becomes a problem of the culinary art rather than of physiology.

1. Osborne, T. B., and Mendel, L. B.: The Use of Soy Bean as Food, Jour. Biol. Chem., 1917, **32**, 369.

2. Daniels, Amy L., and Nichols, Nell B.: The Nutritive Value of the Soy Bean, Jour. Biol. Chem., 1917, **32**, 91. Daniels, Amy L., and Loughlin, Rosemary: Feeding Experiments with Peanuts, ibid., 1918, **33**, 295. The Soy Bean, Its Enzymes and Carbohydrates, editorial, THE JOURNAL A. M. A., Oct. 16, 1915, p. 1372; Peanuts as Food, March 23, 1918, p. 850.

3. Holmes, A. D.: Digestibility of Protein Supplied by Soy Bean and Peanut Press-Cake Flours, Bull. 717, U. S. Dept. Agric., 1918.

Points on Treatment of Bone and Joint Injuries at the Front.—Early splinting; early definitive surgery; early closure; early function through voluntary movements; early appreciation of the best functional position for stiffened joints: shoulder should be fixed in 70 degrees of abduction; elbow at a right angle or even a little less; wrist dorsally flexed; hip abducted 5 degrees, outwardly rotated 10 degrees, flexed 20 degrees; knee, for standing occupation, flexed 20 degrees; for sitting, 30 degrees; ankle with the foot at right angles with the lower leg. Joints in these positions, though completely ankylosed, can be counted on to preserve much useful function for the limb. Immobilization in these favorable positions should be insisted on in the presence of any process or lesion which threatens ankylosis.—*Review of War Surgery and Medicine.*

Current Comment

THE PROBLEM OF ESSENTIAL TEACHERS IN MEDICAL SCHOOLS

Since the entrance of the United States into the world war, several problems have arisen, the solution of which was necessary in order that the medical schools might be kept going and the regular supply of physicians maintained. First came the necessity of keeping medical students at their studies, which was met by establishing the medical enlisted reserve corps. Next came the question of the premedical students, for whom, as noted last week,[1] provision is now made in connection with the Students' Army Training Corps. A third and more serious problem, however, was how to hold at their teaching duties an adequate number of teachers. When the appeal for medical officers was made, many teachers patriotically responded who might better have remained at their college work. In some medical schools the proportion of teachers who entered the government medical services was so great as to endanger the very existence of the institution. This problem has been met by establishing in the Office of the Surgeon-General a list of essential teachers based on lists furnished by the deans of the well-recognized medical colleges. The policy of the Surgeon-General is not to issue commissions to a physician who is on the essential list unless notified by the dean that he has been released. There has been much discussion regarding some form of government recognition of those on the essential list, but no satisfactory method has been found. However, the fact that a physician is listed by the War Department as an essential teacher is a recognition of his teaching ability. Furthermore, the reservation of a physician as an essential teacher is equivalent to assignment to military duty. This is especially so now that medical schools are largely under government control and since the teachers are training students who, as members of the Students' Army Training Corps, are soldiers on active duty in the United States Army. Meanwhile, with this understanding it is believed that essential teachers will be willing to remain loyally at their teaching duties to which they have been assigned. If the student soldiers are to become well-trained medical officers, it is necessary that efficient methods of teaching in the medical school shall be maintained.

THE IMPOSSIBILITIES OF STRAW BREAD AS FOOD

As the indigestible parts of plants are to a large degree composed of complex carbohydrates, the best known of this group being cellulose, it has often been proposed to attempt to convert them into simpler carbohydrate compounds, like the sugars, which are more readily assimilated by the organism. Cattle and other food-producing animals can apparently utilize the "crude fiber" of plants to some extent, possibly through the intervention of the microbiotic agencies in the large gastro-enteric tract of the herbivora; but it would unquestionably be a nutritive gain if a more available product could be prepared from the resistant food residues. As cellulose, pentosans, etc., they serve primarily as "roughage" in the diet; once transformed into absorbable products, they might function just as starch and sugars do. The chemical possibilities here concerned have appealed to conservation enthusiasts in war time to the extent of suggesting the inclusion of chemically treated fibrous products like straw even into the ration of men. Fortunately we are in a position to profit in dietetics as well as in warfare by the mistakes of our enemies. It is reported on the authority of Professor Rubner,[1] the Berlin physiologist, that efforts were made in Germany during the hard winter of 1916-1917 to introduce the chemically treated straw, which experiment had shown to be well utilized by horses and cattle, as a diluent into the bread of the population. Rubner's investigations burst the bubble of possibility in this direction. Whatever may be the value of chemically treated straw in the alimentary tracts of herbivora, it is of inferior use in those species, such as the pig and the dog, with a less complexly constituted digestive canal. The further obviously probable indication of the unsuitability of the treated straw for the purposes of human nutrition has also been verified by Rubner. In the case of the dog, at least three quarters of the straw product remained unabsorbed. In the experiments on man, the addition of such straw to bread led to an increased waste, which was actually greater, in calories, than the energy value of the straw ingested. The straw bread was inferior in every way. Its palatability and texture were bad; it tended to develop distress in the bowel. These were the observations on healthy persons. What the less vigorous might have experienced can only be conjectured. Straw bread was "made in Germany," and we want none of it in America.

VOLUNTEERS FOR U. S. PUBLIC HEALTH WORK

The present epidemic of influenza has made it necessary for the United States Public Health Service to make an urgent call on physicians for help in localities in which the epidemic is unusually severe. A notice of this appeal appeared in THE JOURNAL two weeks ago and has been accorded gratifying response. That notice, however, was for more or less permanent position with the Public Health Service. On another page[2] is an appeal to physicians for temporary service. While those who volunteer for such service will not be in uniform, and while they will have no rank, this service is just as definite a patriotic privilege as is that of serving in the Medical Corps of the Army or Navy. This is especially true at this time when the need of the civilian population for a mobile supply of physicians is so great—for physicians who can be sent from place to place as exigencies require. Physicians who are able to serve in one of the proposed temporary appointments should waste no time in responding to this appeal of the United States Public Health Service.

1. Information for Medical Schools and Program for Premedical Students, THE JOURNAL A. M. A., Oct. 19, 1918, p. 1319.

1. Rubner, M.: Die Verwertung aufgeschlossenen Strohes für die Ernährung des Menschen, Arch. f. Physiol., 1917, p. 74.
2. This issue, p. 1413.

RESPONSIBILITY FOR TYPHOID FEVER

The owners of steamers on the Great Lakes are warned by a recent decision of the federal district court that heavy money penalties may be exacted for illness caused by polluted water.[1] The damages awarded in eleven cases range from $305 to $16,045, totaling $50,462. In the case in question a lake steamer sailing from Detroit used impure water for drinking purposes after the water in the tanks aboard had been exhausted. The evidence submitted was held to prove beyond question that the typhoid cases were contracted by the drinking of this polluted water. The increasing rarity of typhoid fever in this country focuses attention on instances of this sort, so that more attention will doubtless be paid to safeguarding travelers against typhoid infection through oversight or negligence.

THE AMERICAN RED CROSS AND PUERICULTURE IN FRANCE

A goodly portion of the October issue of the *American Journal of Diseases of Children* is concerned with what M. Paul Strauss of Paris has designated as puericulture in France.[2] It bears witness to the splendid service in which the Children's Bureau of the American Red Cross is engaged. Any one who reads at all must have formed some conception of the serious situations created among mothers and children through the displacement of the population of northern France, the lack of medical attention owing to the scarcity of physicians, and the food and fuel crisis, added to the innumerable other deprivations that a country so cruelly invaded has experienced. In the city of St. Etienne, with a population of 180,000 before the war, there were 120 physicians; at present the 250,000 inhabitants depend on the medical services of fourteen physicians. Most villages have been without any since the mobilization. The Red Cross has shared in the management of the child *rapatrié;* it has devoted its best efforts to the reduction of infant mortality; it has promoted the clinics for prenatal care; it has not only given aid to prospective and present mothers and their nurslings, but also has facilitated the plans for protecting young women and promoting social hygiene. Educational work has been no small feature of the campaign. We should have difficulty in rivaling an exhibit of child welfare work such as was staged at Lyons with an attendance of more than 170,000 persons in three weeks. The story of the efforts of the American Red Cross to aid French agencies in uniting all available forces, governmental, philanthropic and medical, in a preventive educational program is inspiring. For us a more immediate lesson has been expressed by the chief of the Children's Bureau of the American Red Cross in France, Professor Lucas of the University of California. He says:

> What I have seen not only in France, but also in England and in this country since returning, has convinced me that now is the psychologic time to develop and coordinate all our child welfare work in this country. I feel that all the different associations which represent the best medical thought in child welfare should certainly get together on a definite coordinated program for this country, and back up our governmental bureaus dealing with child welfare problems. This year in America has already been proclaimed by President Wilson as the "children's year," and it will be a great lost opportunity unless some national program which coordinates all the best efforts both private and governmental is worked out and put on a very sound basis.

This is the psychologic time for many reforms.

1. Engin. News, Sept. 26, 1918, p. 581.
2. Strauss, M. P.: Puericulture in France, Am. Jour. Dis. Child., October, 1918, p. 207. Lucas, W. P.: Red Cross Infant Mortality Campaign in France, ibid., p. 212. Grulee, C. G.: The Work of the Children's Bureau of the American Red Cross in Lyons, ibid., p. 220. Gelston, C. F.: A Public Health Problem in France, ibid., p. 226. Ladd, Maynard: The American Red Cross in the Meurthe-et-Moselle, ibid., p. 236. Knox, J. H. M.: America's Debt to France, ibid., p. 242.

Medical Mobilization and the War

Medical Women's Hospital Established

The American Women's Hospitals No. 1, cooperating with the American Committee for Devastated France and working with the Sixth French Army in the advanced area, is now established in a XV Century chateau near the front. Dr. Barbara Hunt, Bangor, Me., is the director of this unit.

More Units for American Women's Hospitals

The American Women's Hospitals has recently received from Mr. Gibson, special commissioner of the American Red Cross in France, a request for six units, each unit to contain ten medical women, ten nurses' aides, one dentist and four chauffeurs. The Red Cross will supply the nurses required for these units some of which will be placed, under a special arrangement with the French Service de Santé, in French military hospitals where they will care for the American and French wounded soldiers, while other of these groups will be used for refugee work. The first unit, composed of Chicago medical women, which will be known as the Chicago Unit, is already assembled, and one unit will be sent over every month until the entire six are accounted for.

Volunteer Physicians for U. S. Public Health Service Work

Two weeks ago we published an announcement asking for volunteers for permanent work as Acting Assistant Surgeons in the Public Health Service. In addition at the present time the Public Health Service is in urgent need of physicians for temporary duty in connection with the influenza epidemic. The service is organizing this work along state lines in connection with state boards of health. The Surgeon-General of the Public Health Service is anxious to have available physicians in various parts of the country on whom he can call for this temporary emergency work. The salary is $200 a month and $4 per diem allowance in lieu of subsistence. In responding, physicians should furnish the following information:

1. Will serve in his own locality?
2. Will serve in his own state?
3. Will serve in his adjoining states?
4. Will serve anywhere?

As the call is immediate and urgent, it is suggested that any physician who feels that he can do some of this work telegraph to the Surgeon-General, U. S. P. H. S., Washington, D. C., indicating by number, as above, whether he will serve in his own locality, in his own state, in the adjoining state, or anywhere in the country. Or, if he desires to serve only in his own state he should telegraph to "Public Health Service Officer, care State Board of Health." The U. S. Public Health Service has such an officer in each state except Nevada.

Public Health Problems

A sixth course of lectures and discussions on "Public Health Problems Under War and After War Conditions," is being held in the Lecture Hall of the Royal Institute of Public Health, London, on Wednesday in October, November and December. The topics and speakers are as follows:

October 9.—"Anthropometry and National Health." By Professor Arthur Keith, M.D., F.R.C.S.

October 16.—"Racial Reconstruction and the Proposed Ministry of Health." By C. W. Saleeby, Esq., M.D., F.R.S.Ed.

October 23.—"The Obviation of Ship-borne Infections." By W. M. Willoughby Esq., M.D.

October 30.—"The Prevention and Abortive Treatment of Venereal Disease." By Lt.-Col. L. W. Harrison, M.B., D.S.O.

November 6.—"Infection and Disinfection in War Time." By Professor J. M. Beattie, M.D.

November 13.—"The Tuberculous Soldier." By Miss Jane Walker, M.D.

November 20.—"The Care of Pensioners and Disabled Combatants in Relation to National Health and Wealth." By Sir John Collie, M.D., C.M.G.

November 27.—"National Kitchens and the National Health." By Alderman C. Spencer, Director of National Kitchens.

December 4.—"The Rôle of the Ports in the Protection of the Health of the Nation." By Professor E. W. Hope, M.D., D.Sc.

December 11.—"The Organisation and Administration of Child Welfare Centres." By G. Eric Pritchard, Esq., M.D., M.R.C.P.

December 18.—"The Proposed Ministry of Health." By Professor William R. Smith, M.D., D.Sc., LL.D., F.R.S.Ed., Sheriff of the City of London.

American Expeditionary Forces' Weekly Bulletin of Disease

The following paragraphs are taken from the *Weekly Bulletin of Disease*, dated September 23, issued for circulation among American medical officers in France:

Why Wait! Pneumonia Won't

Thin out billets and barracks before instead of after an epidemic has broken out. Whenever a command is thoroughly shot through with grippe or bronchitis or there has been an outbreak of diphtheria and simple sore throats, it is found possible as well as desirable to get more space for the men in barracks, even to the extent of putting them under canvas, and in every instance with most favorable results. Shelter tent existence beats a sick bed. Men living in the open in the bitterest weather are uniformly healthier and especially freer from respiratory infections than are men housed in the same climate. See if you can recognize any of the quarters of the men of your command in this description of billets copied from an inspection of a divisional training area.

The Experience of the American Expeditionary Forces with Respiratory Infections

By respiratory infections are understood to be those diseases which are passed by the moist discharges from the bronchi or trachea, the throat and the nose and mouth, namely, the spit, the saliva and spray. Of the diseases included in the nomenclature of the Sick and Wounded Reports of the American Expeditionary Forces the following eleven diseases are considered respiratory infections:

A	B
1. Mumps	1. Bronchitis (acute)
2. Measles	2. Influenza
3. Scarlet fever	3. Pneumonia (lobar)
4. Diphtheria	4. Tonsillitis (acute)
5. Meningitis (meningococcus)	5. Pneumonia (broncho)
	6. Pharyngitis (acute)

The order in which the two groups are listed above is the order for each group according to the number of days lost from hospitalization of each disease. The incidence rate for pneumonia per 100,000 troops parallels so closely the rate of the other diseases under consideration that the rate of this disease can best be used as a basis of comparison between the experience of the British Armies in France and that of the American Expeditionary Forces.

A.E.F.	1917	B.E.F.	A.E.F.	1918	B.E.F.
	January	8.67	392.3	January	17.18
	February	25.27	155.3	February	6.65
	March	14.58	163.9	March	10.11
	April	10.40	59.0	April	11.80
	May	8.93	16.5	May	7.65
	June	6.23	82.2	June	10.24
66.6	July	7.35	44.6	July	.....
26.9	August	4.88	40.7	August	.....
20.4	September	3.49			
70.21	October	5.88			
66.0	November	6.65			
213.3	December	7.55			

For pneumonia as for the other respiratory infections, here as in civilian experience at home, crowding and close personal contact and exposure while suffering from lowered resistance due to a variety of unfavorable conditions of occupation and environment are apparently the dominant and in many instances the sole determining factors in causing the serious increase of respiratory infections among our troops in France.

Of the 1,613,500 days lost in the American Expeditionary Forces up to June 1, 1918, from all causes, sickness, accident, injury in action and other traumatisms, 1,481,000 days, or 91.78 per cent., were lost because of sickness.

Of the total loss of days due to hospitalization from sickness, 631,226 days, or 42.61 per cent., were due to the eleven respiratory infections under consideration. The total case incidence of these eleven diseases by months from June, 1917, to August, 1918, has been as follows (A) and the rate per 100,000 troops with the American Expeditionary Forces as shown in B.

1917	A.	B.	1918	A.	B.
June	31	221	January	16,843	8,637
July	752	5,013	February	14,412	6,185
August	913	3,226	March	10,135	3,519
September	1,203	2,455	April	6,145	1,634
October	2,798	3,781	May	3,102	571
November	6,925	6,328	June	12,999	1,708
December	12,749	8,499	July	11,096	1,131
			August	12,457	969

The striking effect of the epidemic of influenza coming at a time of year when other respiratory infections are usually at their minimum is shown in the sudden increase in rate in June.

Memorandum for Battalion Surgeons

. . . Never forget, that in the final analysis, the prime and ultimate object of the Medical Department is to assist in the conservation and maintenance at the highest possible point of the fighting efficiency of the line troops. If the men become sick get them well by the best possible means and in the shortest possible time; if wounded, speed their evacuation to hospitals, where definite treatment may be given. Prepare them in every way, by every means available, in the front line stations for evacuation, get them back in the best possible condition. Hold malingerers to their work, but exercise judgment with the slightly ailing men; frequently two or three days' rest treatment in a field hospital will save to the service men with slight indisposition who, if held in the trenches might go on to a severe illness, or to a total loss. The condition in which men are received in the field hospitals from the front lines is always indicative of the efficiency of the men in the advance sectors. It has been noted that some of the diagnosis tags are not being properly made out and that even in the back areas they are often signed by enlisted personnel of the sanitary units. This is, of course, permissible in emergencies, but whenever possible diagnosis tags should be carefully looked over and signed by the medical officer.

Salvaging and Washing Gauze, as Practiced at a Base Hospital

The following method of salvaging and washing gauze, modified from methods in use in civil hospitals in the states, will save 65 to 70 per cent. of used gauze and bandages for reuse. By this method dressings and bandages can be rewashed many times. The process can be handled entirely by convalescent patients, with the supervision of one or two noncommissioned officers or enlisted men of the Medical Detachment who can also run the portable sterilizer:

(*a*) All dressings removed from wounds are saved, in G. I. cans, on surgical wards in dressing rooms, and in operating rooms. These are collected daily and taken to gauze salvage stations which stations should house a portable sterilizer to furnish steam for washing. (*b*) *Sorting.* On receipt at salvage station, dressings are sorted, gauze and bandages separated from cotton and other foreign bodies, all bandages and gauze are saved for washing, except gauze heavily loaded with boric ointment or picric acid. (*c*) *Rinsing.* The gauze and bandages, after sorting, are placed in a large concrete tank of cold water, which is frequently agitated, and changed twice in 24 hours. This is for the purpose of rinsing blood and pus from the dressings. (*d*) *Washing.* After rinsing for 24 hours, gauze is separated from bandages and washed, separately in an ordinary steam washer. If the revolving type is used, the gauze will have

to be placed in cord bags, commonly used by steam laundries in washing collars. If the gauze is washed in a small washer of the "Dolly" type, it will not be necessary to place in cord bags. Wash each load one hour with live steam from sterilizers. (*e*) *Second Rinsing and Drying.* On removal from washer, they are carefully rinsed in tepid water and wrung through hand wringers by patients. They are then hung on lines out of doors to dry, or, in wet weather, are dried in a closed room that is heated by a stove. When nearly dry they are picked over and spread out in piles of equal size. (*f*) *Bulk Sterilization.* They are then sterilized in bulk for one hour, sent to the surgical supply room, sorted into small packages, and resterilized in autoclaves for use in operating rooms, dressing rooms, and for ward dressings. In civil hospital practice, in addition to the above, gauze is usually passed through a hypochlorite bleaching solution. In the present emergency, this step can be omitted without detriment.

Distinguished Service Crosses for Medical Officers

Announcement is made of the award of the Distinguished Service Cross to the following medical officers for the acts of gallantry described:

Capt. C. M. WILLIAMS, Medical Corps, Infantry (cannot identify) "For exceptional heroism in action on the Ourcq River, July 31 and August 1, 1918; northwest of Coulonges, France, August 2, 1918, and on the Heights, overlooking the Vesle River, August 3 to 7, 1918. During these three periods of severe fighting, Captain Williams maintained a dressing station close to the advanced lines and worked continuously night and day under heavy artillery and machine-gun fire."

First Lieut. HARRY S. WHEAT, Medical Corps, Infantry (Harry R. Wheat, Mrs. Mary L. Wheat, mother, 1911 Massachusetts Avenue, North Cambridge).—"For extraordinary heroism in action, August 16, 1918, from Sergy to Mont St. Martin, France, between the Ourcq and Vesle Rivers. During the attack on August 1, 1918, he went forward with the first wave and established a dressing station in an advanced position to render immediate aid to the wounded. On August 5, at St. Martin, after having been knocked down by the explosion of a shell and while under severe fire and machine-gun fire, he displayed exceptional coolness and devotion to duty in rendering surgical attention to others who had been wounded by the same shell."

Sergeant LEROY MORNINGSTAR, Medical Department Infantry, has been awarded the Distinguished Service Cross. "Sick, gassed and stunned by shells, he remained at his post of duty under heavy fire and bravely assisted the succoring of soldiers who had been injured near Vaux, France, July 1, 1918."

Private JAY LER ANTES, Medical Department, Infantry, has been awarded the Distinguished Service Cross, posthumously. "He fearlessly exposed himself to barrage and machine gun fire at Cantigny, France, May 28 and 29, 1918, to perform his duties as stretcher bearer in order that the sufferings of wounded might be relieved and lives saved with unselfish heroism. He left the security of the trench to go to wounded in a machine gun emplacement and while performing his noble duty was killed."

Captain CLAUDE A. MARTIN, Welsh, La., Medical Department, Infantry, has been awarded the Distinguished Service Cross. "He operated a battalion dressing station near Vaux, France, July 1, 1918, although the station was practically destroyed by shell fire."

Assistant Surgeon O. D. KING, attached to U. S. M. C.—"For extraordinary heroism in action near the Bois de Belleau, June 19, 1918. On two successive days the regimental aid station in which Surgeon King was working was struck by heavy shells and in each case demolished. Ten men were killed and a number of wounded were badly hurt by falling timbers and stone. Under these harassing conditions this officer continued without cessation his treatment of the wounded, assisting in their evacuation and setting an inspiring example of devotion and courage to the officers and men serving under him."

Passed Assistant Surgeon JOEL T. BOONE, U. S. M. C.—"For extraordinary heroism in action in the Bois de Belleau, France, June 19, 1918. On two successive days the regimental aid station in which Surgeon Boone was working was struck by heavy shells and in each case demolished. Ten men were killed and a number of wounded were badly hurt by falling timbers and stone. Under these harassing conditions this officer continued without cessation his treatment of the wounded, superintending their evacuation, and setting an inspiring example of heroism to the officers and men serving under him. On June 25, 1918, Surgeon Boone followed the attack by one battalion against enemy machine-gun positions in the Bois de Belleau, establishing advanced dressing stations under continuous shell fire."

Passed Assistant Surgeon WILLIAM T. GILL, attached to U. S. M. C.—"For extraordinary heroism in action near Vierzy, France, July 19, 1918. He established a forward dressing station behind the advanced lines and for fifteen hours treated the wounded and directed their evacuation while subjected to intense front and flank fire and in the absence of adequate shelter. His fearlessness under these conditions saved the lives of many wounded who would otherwise have been lost to the service. He disregarded personal danger and remained in an exposed position in order to give immediate care to the unfortunate."

COMMISSIONS OFFERED AND ORDERS TO DUTY ON ACCEPTANCE

Alabama

To Fort Oglethorpe for instruction, Lieuts. V. J. CRAGG, Clanton; T. DUNCAN, Sellers.

To Fort Sam Houston, Texas, Lieut. W. W. ROWAN, Alabama City.

Arizona

To Fort Riley for instruction, Lieuts. A. KIRMSE, Globe; G. E. GOODRICH, Phoenix.

To report to the commanding general, Western Department, Lieut. J. G. WILSON, Willcox.

Arkansas

To Camp Travis, Texas, Lieut. R. H. WILLETT, Jonesboro.

To Fort Oglethorpe for instruction, Lieut. S. HARRIS, Wilmar.

To Fort Riley for instruction, Capt. L. L. PURIFOY, Eldorado; Lieuts. T. HENDERSON, Argenta; P. A. RIDDLER, Fort Smith; C. R. CHESNUTT, Little Rock; E. W. BLACKBURN, Ozark; W. H. MOCK, Prairie Grove.

To Fort Worth, Texas, base hospital, for instruction, Capt. E. F. DAY, Arkansas City.

To Hoboken, N. J., Capt. J. N. CLIATT, Millwood.

To report to the commanding general, Southeastern Department, Lieut. T. E. JEFFERY, Fort Smith.

California

To Camp Cody, N. M., base hospital, for instruction, Capt. W. H. SMITH, Lieut. C. E. EARLY, Los Angeles.

To Camp Fremont, Calif., Capt. D. P. FLAGG, Los Angeles. Base hospital, Capt. C. L. LOWMAN, Los Angeles. Base hospital, for instruction, Capts. A. B. McCONNELL, Fresno; L. P. ADAMS, Oakland.

To Camp Kearney, Calif., Capt. J. H. TURNER, Huntington Park; Lieut. D. N. RICHARDS, Berkeley. Base hospital, Capt. C. P. PROUDFOOT, San Louis Obispo. Base hospital, for instruction, Capts. A. C. THORPE, Los Angeles; J. C. ROBERTSON, Modesto; C. G. HILLIARD, Redlands.

To Camp Lewis, Wash., Capts. J. E. HILL, Azusa; L. C. GREGORY, Fort Bragg; Lieuts. N. A. LEAKE, Gardena; T. H. TRINWORTH, Los Angeles. Base hospital, Capt. R. W. HARTWELL, Santa Barbara.

To Fort Oglethorpe for instruction, Capts. R. C. DUNDAS, J. A. GARLAND, Los Angeles; H. R. PAINTON, Lieut. J. N. TAVLOPOULOS, San Francisco.

To Fort Riley for instruction, Lieuts. J. A. DOUGHERTY, K. C. GUMMESS, San Francisco; F. H. KOEPKE, Watsonville.

To Fort Sam Houston, Texas, Capt. O. F. KONANTZ, Los Angeles.

To San Francisco, Calif., Letterman General Hospital, Lieut. J. SCHWARZ, San Francisco.

Colorado

To Camp Pike, Ark., base hospital, Capt. W. J. CHURCHILL, Longmont.

To Dallas, Texas, Love Field, Lieut. W. G. MUDD, Denver.

To Denver, Colo., Capt. J. H. ALLEN, Lieut. R. LEWIS, Denver.

To Fort Riley for instruction, Lieuts. K. F. ROEHRIG, L. H. RUEGNITZ, Denver.

To report to the commanding general, Southern Department, Lieut. W. W. YATES, Loveland.

Connecticut

To Camp Joseph E. Johnston, Fla., Lieut. T. E. PARKER, Waterbury.

To Fort Oglethorpe for instruction, Lieut. J. W. FRUIN, Waterbury.

To Hoboken, N. J., Lieuts. C. V. CALVIN, Bridgeport; L. F. HERZ, New Haven.

To New Haven, Conn., Yale Army Laboratory School, Capt. L. F. COCHEU, Hampton.

To Plattsburg Barracks, N. Y., Capt. L. A. NOTKINS, New Haven.

District of Columbia

To Camp Greene, N. C., base hospital, Lieut. E. A. TAYLOR, Washington.

Florida

To Camp Joseph E. Johnston, Fla., Capt. J. L. WEEKS, Perry; Lieut. S. E. DRISKELL, Raiford.

To Fort Oglethorpe for instruction, Capt. B. J. BOND, Tallahassee.

Georgia

To Camp Gordon, Ga., base hospital, Major F. P. CALHOUN, Atlanta.

To Camp McClellan, Ala., Lieut. W. A. NORTON, Savannah.

To Camp Wadsworth, S. C., Lieut. S. W. JOHNS, Doles.

To Camp Wheeler, Ga., Lieut. J. W. ODEN, Milledgeville.

To Fort Oglethorpe for instruction, Capts. L. C. ROUGHLIN, J. D. THOMSON; Lieuts. F. C. BIVINGS, Atlanta; B. S. BRANHAM, Sandersville; J. O. BALDWIN, Fort Gaines; J. F. SIGAFOOS, Honey Creek.

Hawaii

To report to the commanding general, Hawaiian Department, Capt. I. J. SHEPHERD, Honolulu.

To San Francisco, Calif., Letterman General Hospital, for instruction, Capt. H. H. BLODGETT, Honolulu.

Idaho

To Fort Riley, base hospital, for instruction, Lieut. D. E. CORNWALL, St. Maries. For instruction, Capts. J. FREMSTAD, Burley; J. D. SHINNICK, Cottonwood; C. B. ALLEN, Parma; Lieuts. E. L. HARGIS, Ashton; H. H. DUTTON, Hailey; E. E. HARDY, Kellogg; J. N. DAVIS, Kimberly; E. H. ELMORE, Rupert.

Illinois

To Camp Custer, Mich., Lieut. J. M. DURIN, Chicago. Base hospital, Capts. H. P. BAGLEY, E. P. NORCROSS, Chicago.

To Camp Grant, Ill., Capts. L. H. FRIEDRICH, C. B. KING, U. G. WINDELL; Lieut. J. E. KOONS, Chicago. *To examine the command* for nervous and mental diseases, Lieut. T. G. McLIN, Jacksonville.

To Camp McClellan, Ala., Lieut. A. J. PROMINSKI, Chicago.

To Camp Shelby, Miss., base hospital, for instruction, Capt. F. G. MORRILL, Havana.

To Camp Sherman, Ohio, base hospital, for instruction, Capts. R. S. BARNSBACK, Edwardsville; W. R. PARKES, Evanston.

To Camp Zachary Taylor, Ky., Lieut. H. A. LONG, Effingham.

To Fort Benjamin Harrison, Ind., Lieut. C. R. BATES, Roodhouse.

To Fort Oglethorpe for instruction, Capts. G. A. ALMFELT, C. E. BODDIGER, Chicago; F. P. HORAN, Evanston; L. A. BURHANS, Peoria; Lieuts. A. J. KLINT, C. W. LENHART, Danville; W. F. BOWMAN, Fishhook; R. G. DAKIN, Sandwich.

To Fort Riley for instruction, Capts. W. A. UEHREN, Aurora; W. T. ZIEGLER, Canton; A. PECH, Chicago; W. N. MacCHESNEY, Chicago Heights; O. P. GRANT, Easton; W. A. GOTT, Washington; Lieuts. O. F. REINHARDT, Aviston; E. A. BEHRENDT, Bloomington; W. R. ABBOTT, G. L. APFELBACH, M. L. ARKIN, N. L. BLITZSTEN, E. J. COHN, C. C. COOLEY, C. F. GOETZINGER, L. CROTOWSKI, F. C. KLOOS, C. A. KROGH, T. F. LEATHERWOOD, J. G. WIEDDER, J. B. WILCOX, E. F. WINTERBERGER, Chicago; O. J. CULBERTSON, East St. Louis; C. S. WILLIAMSON, Fairmount; R. M. HATHAWAY, Farmer City; C. H. FOOTE, Girard; C. L. VANATTA, Hidalgo; A. C. MOORHEAD, Leland; W. M. CATON, Mason City; B. H. HARDINGER, Mattoon; F. E. INKS, Polo; M. A. NIX, Princeton; C. V. WINSETT, Prophetstown; J. C. MURPHY, Ridgeway; A. J. DALTON, St. Joseph.

To Roland Park, Md., Lieut. W. T. MORFETT, Blue Mound.

Indiana

To Ann Arbor, Mich., State Psychopathic Hospital, for intensive training, Capt. H. B. SHACKLETT, New Albany.

To Camp Meade, Md., Lieut. G. R. HAYS, Richmond.

To Camp Sevier, S. C., Lieut. J. P. WOLF, New Market. Base hospital, Capt. J. R. SICKLER, Frankfort.

To Camp Zachary Taylor, Ky., base hospital, Capt. C. E. DUFFIN, Richmond. Base hospital, for instruction, Capt. C. E. VARIER, South Bend.

To Colonia, N. J., Capt. W. C. WINSTANDLEY New Albany.

To Denver, Colo., Capt. B. ERDMAN, Indianapolis.

To Fort Benjamin Harrison, Ind., Lieuts. J. C. KINCAID, Indianapolis; J. A. MEINER, Kokomo.

To Fort Oglethorpe for instruction, Capts. J. W. LITTLE, C. W. MARXER, Indianapolis; C. E. GILLESPIE, Seymour; O. S. TAYLOR, Whitestown; Lieuts. G. ALEXANDER, Bedford; I. J. GILL, Dugger; E. B. FLAVIEN, Logansport.

To Fort Riley, Capt. F. RODENBECK, Arcadia. For instruction, Capts. W. G. CULLODEN, F. P. REID, Indianapolis; J. D. STURDEVANT, Noblesville; Lieuts. C. M. JACKSON, Elizabethtown; W. A. HODGES, Emison; I. T. OLIPHANT, Farmersburg; E. D. SKEEN, Gary; C. R. PRICE, Geneva; C. U. THRALLS, Hymera; H. S. LEONARD, A. L. WALTERS, Indianapolis; C. M. WRAY, New Richmond; V. A. SHANKLIN, West Terre Haute.

Iowa

To Camp Dodge, Iowa, Lieuts. N. S. BEVINS, Fort Atkinson; F. E. E. ST. CLAIR, Hampton. Base hospital, for instruction, Lieut. G. B. BROWN, Clairion.

To Camp Grant, Ill., Capt. J. H. SCHRUP, Dubuque. Base hospital, for instruction, Lieut. P. M. DAY, Jr., Barnes City.

To Fort Oglethorpe for instruction, Capts. E. RICE, Ames; I. W. TRAVERSE, Fort Mediann; B. COURSHON, Sioux City; Lieuts. R. R. HARRIS, Dubuque; R. E. BRISBINE, Mason City; H. M. HUSTON, Ruthven; F. L. NICHOLS, Sutherland.

To Fort Riley for instruction, Capt. O. KREISA, Cedar Rapids; Lieuts. S. M. FERGUSON, Avoca; C. E. LOWREY, Centerville; B. F. McNEILL, Charles City; L. W. WARD, Fairbank; A. A. ROSE, Gilbert; A. J. MEYER, Hawarden; A. F. WATTS, Iowa City; J. J. PITCHER, Mt. Pleasant; V. O. MUENCH, Nichols; I. A. SNYDER, Roland; C. C. COLLESTER, Spencer; F. S. BOWEN, Woodburn.

Kansas

To Camp Grant, Ill., Lieut. R. M. TROUP, Garden City.

To Fort Oglethorpe for instruction, Capts. J. G. KENNEDY, Altoona; J. L. GROVE, Newton; Lieut. E. L. KALBFLEISCH, Newton.

To Fort Riley for instruction, Capts. B. R. RIEY, Benedict; H. A. BROWNE, Galena; F. K. MEADE, Hays; Lieuts. L. M. HINSHAW, Bennington; C. R. McFARLAND, Blue Rapids; A. JOHNSON, Clyde; R. P. PIERCE, Dunkirk; W. R. MORTON, Green; C. N. JOHNSON, Wichita.

Kentucky

To Ann Arbor, Mich., State Psychopathic Hospital, for training, Lieut. W. E. RENDER, Lakeland.

To Camp Greene, N. C., Lieuts. S. M. LINVILLE, Centerville; O. D. BROCK, London; J. S. WHITSON, Slaughters; D. J. THOMPSON, Webbville.

To Camp Jackson, S. C., base hospital, for instruction, Capt. J. A. DAVIS, Covington.

To Camp Joseph E. Johnston, Fla., Capt. J. M. FERGUSON, Central City; Lieut. C. L. NICHOLS, Louisville.

To Camp Meade, Md., Lieut. M. COMBS, Pineville.

To Camp Sevier, S. C., Lieut. B. C. OVERBOY, La Center.

To Fort Benjamin Harrison, Capts. W. T. BARNETTE, Springfield; B. J. NEARY, Waverly.

To Fort Oglethorpe for instruction, Capts. J. M. SALMON, Ashland; J. D. JACKSON, V. RAWSON, Danville; C. H. STRUBLE, Dayton; C. A. VANCE, Lexington; G. S. BROCK, London; D. A. PENICK, Nicholasville; E. B. SMITH, Shelbyville; W. A. BUSH, Winchester; Lieuts. H. S. HARNED, Boston; E. L. GOWDY, Campbellsville; J. N. SMITH, Christianburg; A. G. CALDWELL, Covington; A. P. DOWDEN, Eminence; S. W. COHN, Fulton; C. R. MORTON, Hanson; A. E. POPHAM, Knottsville; H. F. POHLMEYER, Lexington; C. W. KASH, Foorefield; P. K. McKENNA, Mount Sterling; A. R. KEMPF, Olmstead; H. V. USHER, Oscar; M. H. WALKER, Panther; O. P. CHAPMAN, Port Royal; D. G. SKAGGS, Prospect; E. BARR, Rome; H. B. ANDERSON, Shawhan; W. L. MORSE, St. Charles.

To Fort Riley for instruction, Lieuts. J. N. BAILEY, Fredonia; J. W. FITCH, Louisville.

To Newport News, Va., Lieut. E. E. LINVILLE, Mount Olivet.

Louisiana

To Camp Beauregard, La., Lieut. J. F. POLK, Slidell. Base hospital, Lieut. E. McCARTHY, New Orleans.

To Camp Joseph E. Johnston, Fla., Lieuts. J. W. A. SMITH, New Orleans; T. BUTLER, St. Francisville.

To Fort Oglethorpe for instruction, Lieuts. A. B. CHILDS, Eunice; J. G. HIRSCH, Harvey; C. A. BEATLE, J. B. HARNEY, H. B. SEEBOLD, New Orleans; M. S. PICARD, Shreveport; A. M. PETERS, Winnfield.

To New York, Neurological Institute, for instruction, Lieut. J. I. PETERS, Alexandria.

Maine

To Newport News, Va., Capt. E. CAPLAN, Portland.

Maryland

To Camp Jackson, S. C., base hospital, for instruction, Lieut. W. N. PALMER, Easton.

To Camp Meade, Md., base hospital, Capt. H. K. FLECKENSTEIN, Baltimore.

To Fort Oglethorpe for instruction, Lieuts. I. C. DICKSON, E. C. LEHNERT, Baltimore; J. H. BAY, Harve de Grace; F. A. MILLER, Salisbury.

To New Haven, Conn., Yale Army Laboratory School, for instruction, Lieut. H. FRIED, Baltimore.

To Newport News, Va., Capt. B. S. HANNA; Lieuts. A. G. WEBSTER, Baltimore; W. H. COULBOURN, Crisfield; F. T. BROOKS, Federalsburg.

Massachusetts

To Camp Abraham Eustis, Va., Lieut. W. W. MARSTON, Newton.

To Camp Devens, Mass., base hospital, Major F. H. VERHOEFF, Boston. Base hospital, for instruction, Capt. J. P. GRAHAM, Springfield; Lieut. A. E. DARLING, Lynn.

To Camp Dix, N. J., base hospital, for instruction, Lieut. G. J. CONNOR, Haverhill.

To Camp Meade, Md., Lieut. H. M. KEMP, Greenfield.

To Fort Oglethorpe for instruction, Capts. F. E. DRAPER, J. S. MAY, Boston; T. F. BRASSIL, Cambridge; R. A. RICE, Fitchburg; W. L. HALE, North Attleboro; A. L. BROWN, Winchester; Lieuts. C. E. MEYER, Chicopee; P. J. SULLIVAN, Dalton; G. A. CONNOR, East Cambridge; F. F. DEXTER, Longmeadow; E. L. HILL, Millis; A. O. METIVIER, Springfield; T. M. CONNELL, Walpole; R. M. MARR, Westfield; M. BAFF, Worcester.

To Hoboken, N. J., Lieuts. L. LAKE, Cambridge; R. N. BROWN, Malden.

To New Haven, Conn., Yale Army Laboratory School, for instruction, Lieut. F. D. JONES, Springfield.

To Newport News, Va., Lieut. M. M. MURPHY, Brockton.

Michigan

To Camp Custer, Mich., base hospital, for instruction, Lieuts. B. S. LONEY, Detroit; E. S. THORNTON, Muskegon.

To Camp Zachary Taylor, Ky., Lieuts. G. SEWELL, Detroit; J. J. O'MEARA, Jackson.

To Fort Benjamin Harrison, Lieut. L. E. WESTCOTT, Cobleville.

To Fort Oglethorpe for instruction, Capt. G. A. SEYBOLD, Jackson; Lieut. H. L. MECK, Petersburg.

To Fort Riley for instruction, Lieuts. L. E. WERRY, Calumet; F. C. MUSSER, C. M. TURRELL, Detroit; E. T. BRUNSON, Ganges.

To Washington, D. C., Lieut. C. W. HEALD, Battle Creek.

Minnesota

To Camp Dodge, Iowa, base hospital, Capt. G. E. BENSON, Minneapolis. Base hospital, for instruction, Capt. A. N. COLLINS, Duluth.

To Camp Grant, Ill., base hospital, for instruction, Lieut. C. LEMBKE, St. Paul.

To Camp Lee, Va., base hospital, Capt. P. A. HIGBEE, Minneapolis.

To Fort Riley for instruction, Lieuts. C. F. CARSTENS, Hibbing; D. M. O'DONNELL, Ortonville; B. W. JARVIS, St. Paul.

To Newport News, Va., Capt. J. L. CRENSHAW, Rochester.

Mississippi

To Camp Beauregard, La., Lieut. J. M. Smith, Magnolia.

To Camp Joseph E. Johnston, Fla., Capts. H. L. McKINNON, Hattiesburg; W. D. McCALIP, Yazoo City; Lieuts. O. H. OLSEN, Hattiesburg; B. C. CRISLER, Itta Bena; B. F. McARTHUR, Lizelia; D. T. BROOK, McComb; H. B. OLIVER, Sledge.

To Camp McClellan, Ala., Lieut. J. C. BUCKLEY, Poplarville.

To Fort Oglethorpe for instruction, Capt. M. WATKINS, Natchez; Lieuts. R. E. HONNOLL, Ashland; D. W. MAGEE, Caseyville; R. S. PEARCE, Falkner; O. O. AUSTIN, Harperville.

To Fort Riley for instruction, Lieut. L. H. BREVARD, Eudora.

Missouri

To Camp Beauregard, La., base hospital, for instruction, Lieut. E. BOEHM, St. Louis.

To Camp Dodge, Iowa, base hospital, Capt. S. L. GETTYS, St. Louis.

To Camp Grant, Ill., base hospital, Lieut. C. D. SCOTT, St. Louis.

To Camp Logan, Texas, base hospital, Lieut. H. G. PIEPER, St. Louis.

To Camp Pike, Ark., base hospital, Capt. O. A. SMITH, Farmington.

To Camp Zachary Taylor, Ky., base hospital, for instruction, Capt. W. H. GENTRY, Carthage.

To Fort Oglethorpe for instruction, Capt. J. H. FULBRIGHT, Springfield; Lieuts. U. G. STREIBY, Brownington; J. W. L. BRENNAN, St. Louis; J. L. HORN, Williamsville.

To Fort Riley for instruction, Capts. T. P. FORE, Brookfield; W. J. CLARK, Maysville; E. W. SHRADER, Moberly; A. L. McNAY, Pacific; B. B. SIMMONS, St. Joseph; C. E. DUDLEY, E. LOEW, J. A. LOTZ, C. H. POPE, St. Louis; Lieuts. G. H. SHIRLEY, Argyle; J. BEST, High Hill; J. A. BEEBE, H. CZARLINSKY, C. F. MARTIN, Kansas City; J. F. GULIC, Koshkonong; H. W. OYLER, Mill Grove; E. E. EVANS, New Florence; C. H. CULLERS, Spickard; R. L. BYRD, H. B. DePEW, J. E. DOLL, M. J. GLASER, C. F. HENKE, C. R. REIDER, P. H. SCHERER, F. J. SMITH, W. F. STEIN, O. VIERLING, St. Louis; A. TRAUBITZ, Vanduser; A. J. COURSON, Williamsburg.

Montana

To Camp Dodge, Iowa, base hospital, for instruction, Capt. W. V. KINGSBURY, Butte.
To Camp Grant, Ill., base hospital, for instruction, Capt. J. G. THOMPSON, Helena.
To Fort Riley for instruction, Lieuts. R. B. DURNIN, F. E. KEENAN, Great Falls.
To New Haven, Conn., Yale Army Laboratory School, for instruction, Lieut. J. C. F. SIEGFREIDT, Bearcreek.

Nebraska

To Camp Bowie, Texas, base hospital, for instruction, Lieut. C. C. HICKMAN, Lincoln.
To Camp Dodge, Iowa, base hospital, for instruction, Lieut. R. L. IVINS, Crawford.
To Camp Gordon, Ga., base hospital, Capt. I. S. CUTTER, Omaha.
To Fort Oglethorpe for instruction, Lieuts. T. T. HARRIS, B. A. McDERMOTT, Omaha.
To Fort Riley for instruction, Capt. F. J. KALAL, Clarkson; Lieuts. G. W. BRIGGS, Arthur; C. E. KIDDER, Holstein.

New Hampshire

To Fort Oglethorpe for instruction, Lieuts. L. B. MARCOU, Berlin; F. H. LOVEJOY, Milford.
To report to the commanding general, Southeastern Department, Capt. J. E. BLAKE, Lisbon.

New Jersey

To Bound Brook, N. J., Lieut. J. T. LEAHY, Bound Brook.
To Camp A. A. Humphreys, Va., Capts. H. D. McCORMICK, Kenvil; F. A. ROBERTS, Newark.
To Camp Colt, Pa., Lieut. G. H. LEBRET, Secaucus.
To Camp Crane, Pa., Lieuts. G. R. WRIGHT, Landing; H. H. RICH, Newark.
To Camp Devens, Mass., base hospital, Capt. E. A. CURTIS, Newark.
To Camp Dix, N. J., base hospital, Capt. S. W. CLARK, Atlantic City; Lieut. J. F. BOWMAN, Irvington.
To Camp Jackson, base hospital, for instruction, Lieut. W. SPICKERS, Paterson.
To Camp Lee, Va., to examine the command for nervous and mental diseases, Lieut. G. B. McMURRAY, Greystone Park.
To Camp McClellan, Ala., base hospital, Lieut H. G. HOLLER, Newark.
To Camp Meade, Md., Lieut. A. W. BOWKER, Atlantic City.
To Camp Sevier, S. C., to examine the command for nervous and mental diseases, Lieut. G. W. DAVIES, Cedargrove.
To Camp Wadsworth, S. C., to examine the command for nervous and mental diseases, Lieut. G. R. HAMPTON, Greystone Park.
To Fort Oglethorpe for instruction, Capts. W. H. AXFORD, Bayonne; T. P. BOYLE, Newark; H. D. WEBB, Orange; Lieuts. M. S. FRANK, C. J. LARKEY, Bayonne; H. C. UPCHURCH, Dover; A. V. SIMMONS, Irvington; E. L. CREVELING, N. L. ROWE, Jr., Jersey City; R. M. COHN, L. R. DAVIS, Newark; H. C. CASSINI, Orange; H. B. HESS, C. J. KANE, Paterson; W. COTTRELL, Rutherford; J. M. DANE, South Orange; W. S. McDANNALD, Tenafly; A. UREVITZ, West Hoboken; W. FESSLER, West New York.
To Hoboken, N. J., Capt. W. GAUCH, Newark; Lieuts. J. J. HUNT, Bayonne; J. P. COLL, Newark; J. G. COTTRELL, Perth Amboy.
To Lakewood, N. J., Capt. T. ALSOP, Atlantic City.
To New Haven, Conn., Yale Army Laboratory School, for instruction, Lieut. H. A. SCHEPPACH, Newark.
To Newport News, Va., Lieut. H. J. GILBERT, Newark.
To Washington, D. C., St. Elizabeth's Hospital, for intensive training, Lieut. N. W. LAWLESS, Morristown.

New Mexico

To Fort Riley for instruction, Lieut W. M. LANCASTER, Plain.
To report to the commanding general, Southern Department, Capt. R. L. BRADLEY, Roswell.

New York

To Camp Crane, Pa., Lieuts. A. W. WAGNER, Buffalo; L. H. SMITH, New York.
To Camp Devens, Mass., Lieuts. J. W. W. DIMON, Utica. Base hospital, Capt. E. R. LEWIS, Rochester. Base hospital, for instruction, Capts. H. G. BENTZ, J. H. CARR, Buffalo.
To Camp Dix, N. J., base hospital, Lieuts. C. W. BETHUNE, Buffalo; D. A. LUBARSKY, New York. Base hospital, for instruction, Capt. C. H. GOODRICH, Brooklyn; Lieut. B. W. SEAMAN, Rockville Center.
To Camp Hancock, Ga., base hospital, for instruction, Capt. H. D. FURNISS, New York.
To Camp Jackson, S. C., Lieut. F. X. MARINARO, Brooklyn.
To Camp Logan, Texas, base hospital, Lieut. M. T. SIEGEL, New York.
To Camp McClellan, Ala., base hospital, Capt. S. H. DeCOSTE, Brooklyn.
To Camp Meade, Md., Lieuts. N. J. McCAUL, Brooklyn; J. SAFIAN, New York. Base hospital, for instruction, Lieuts. H. F. VAN LOON, Albany; H. M. KALVIN, Brooklyn.
To Camp Sheridan, Ala., base hospital, Capt. M. J. TIERNEY, Hamaroneck.
To Camp Wadsworth, S. C., base hospital, for instruction, Lieut. S. O. SHUMWAY, Brooklyn.
To Camp Wheeler, Ga., base hospital, for instruction, Lieut. A. H. SCHMITT, New York.
To Camp Zachary Taylor, Ky., base hospital, Capt. S. R. FOWLER, Syracuse.
To Colonia, N. J., Lieut. A. J. WESTLAKE, Elmira.
To Fort Oglethorpe for instruction, Capts. P. W. COSTELLO, Brooklyn; A. E. BRENNAN, F. ST. J. HOFFMAN, F. B. WILLARD, Buffalo; W. B. BROOKS, Mohawk; A. H. MOORE, New Rochelle; M. BRANNER, E. BRUNOR, New York; A. C. KLINE, Prospect; G. A. MARION, Rochester; P. S. YOUNG, Sidney; W. P. PINSONEAULT, Watertown; Lieuts. H. B. BROWNELL, J. M. FLANNERY, J. N. KIEFFER, S. A. MOORE, A. G. OSTWALD, F. H. PALMER, V. REINSTEIN, Buffalo; L. C. BROUGHTON, Castle; W. BRADY, Elmira; L. A. BOUTON, Fonda; W. G. PHIPPS, Mount Vernon; D. G. EWART, S. KUTSCHER, E. W. MacADAM, H. H. SHIRAS, New York; C. G. SMITH, Port Jefferson; A. V. WALKER, Rochester; R. K. ROSENBERGER, Schenectady; G. MOUNT, South Butler; R. W. RENWICK, Staten Island; C. H. EVANS, Syracuse; A. E. RICHMOND, Wayland.
To Fort Porter, N. Y., Capt. P. SMITH, New York.
To Hoboken, N. J., Capts. J. E. GOLDING, Brooklyn; F. A. TEEPELL, Russell; Lieuts. R. H. GRAY, Brooklyn; P. C. CAMPBELL, J. L. GALLAGHER, E. P. REIMANN, Buffalo; R. H. DUNNING, Eastwood; G. H. LEADER, Penn Yan; J. A. BURNS, Wilson.
To New Haven, Conn., Lieut. M. NORMAN, Bedford Hills.
To New Haven, Conn., Yale Army Laboratory School, for instruction, Capt. W. B. STONE, Schenectady; Lieuts. F. D. CARR, Batavia; J. M. TAMRAZ, Brooklyn.
To Newport News, Va., Lieuts. A. E. GREENWOOD, R. C. WEITHAS, Brooklyn; J. G. McGILLICUDDY, Little Falls; E. C. DOUGLAS, New York; H. MacDONALD, Schenectady.
To New York, Cornell Medical College, for instruction in roentgenology, Lieut. A. S. UNGER, New York. Neurological Institute, for intensive training, Capt. G. C. FISK, Buffalo.
To Plattsburg, N. Y., Capt. W. TIMME, New York.
To report to the commanding general, Southeastern Department, Capts. J. P. BARR, B. H. BRADY, Buffalo.
To Rockefeller Institute, Capts. T. S. GITHENS, J. P. HOGUET, New York.
To Syracuse, N. Y., Lieut. D. BRUMBERG, Buffalo.
To Washington, D. C., St. Elizabeth's Hospital, Capt. D. C. MAIN, Alfred; for intensive training, Capt. J. F. SHANAHAN, Buffalo; Lieut. H. C. BURGESS, Canandaigua.
To Williamsbridge, N. Y., Major E. S. THOMSON, New York; Lieut. L. BROOKS, Rome.

North Carolina

To Fort Oglethorpe for instruction, Capt. W. J. McANALLY, High Point; Lieut S. F. TILLOTTSON, King.
To New Haven, Conn., Yale Army Laboratory School, for instruction, Lieut. H. B. HIATT, High Point.
To Newport News, Va., Lieut. B. K. BLALOCK, North Charlotte.

North Dakota

To Fort Riley, base hospital, Lieut. R. C. HERON, Tolma. For instruction, Lieut. F. E. EWING, Kennare.

Ohio

To Ann Arbor, Mich., State Psychopathic Hospital, Lieut. J. H. BERRY, Lima.
To Camp Custer, Mich., Lieuts. O. P. ULRICH, Orrville. Base hospital, for instruction, Lieut. R. H. McKAY, Akron.
To Camp Meade, Md., Lieuts. P. E. BEACH, Cleveland; F. C. DUCKWALL, Scott.
To Camp Sevier, S. C., Lieut. H. D. SCHELL, Hamilton.
To Camp Sherman, Ohio, base hospital, Capt. E. H. STONE, Cleveland.
To Camp Zachary Taylor, Ky., base hospital, for instruction, Capt. A. CROTTI, Columbus; Lieut. O. BEHMAN, Cincinnati.
To Fort Benjamin Harrison, Lieuts. L. L. McHENRY, Cheviot; L. C. KINTZLER, Cleveland.
To Fort Oglethorpe for instruction, Capts. O. M. SHIREY, Cleveland; H. H. FISHER, Columbus; W. SHIPE, Middletown; Lieuts. V. E. KAUFMAN, J. F. O'HARA, Canton; J. A. BLACK, E. M. DEACON, W. R. GOFF, A. W. WARREN, Cleveland; S. M. BECK, Dayton; C. G. HISSONG, Hamler; J. M. COLEMAN, Loveland; E. R. ALEXANDER, Rittman; J. B. KLINGENSMITH, Sebring; J. E. FURRY, Springfield; C. W. MONTGOMERY, Sycamore; E. F. TODHUNTER, Washington; E. E. COBURN, West Milton; R. G. MOSSMAN, Youngstown.
To Hoboken, N. J., Lieut. H. B. LARIMORE, Sparta.
To New Haven, Conn., Lieut. C. C. KENNEDY, Bethel.
To New York, Cornell Medical College, for instruction, Lieut. G. F. THOMAS, Cleveland.
To report to the commanding general, Southeastern Department, Lieut. J. R. JAMESON, Apple Creek.

Oklahoma

To Camp Kelly, South Antonio, Texas, Lieut. H. C. SCHENCK, Muskogee.
To Fort Oglethorpe for instruction, Lieuts. J. J. BARBER, Laverne; E. B. MILLER, Wakita.
To Fort Riley for instruction, Lieuts. H. A. HOWELL, Holdenville; J. S. McFADIN, Hollis; W. G. PHILLIPS, Skistook; J. M. BUCHANAN, Tulsa; F. D. MARTIN, Vinita.

Oregon

To Camp Lewis, Wash., Capt. R. V. MOORE; Lieuts. J. H. CARRICO, Portland; E. H. HOBSON, Scio. Base hospital, for instruction, Capt. M. K. HALL, LaGrande.
To Fort Riley for instruction, Lieuts. M. M. LEVY, W. A. TRIMBLE, Portland.

Pennsylvania

To Camp Crane, Pa., Lieut. A. SOFFEL, Pittsburgh.
To Camp Devens, Mass., base hospital, Lieut G. J. FELDSTEIN, Pittsburgh.
To Camp Gordon, Ga., base hospital, Capt. S. S. BROWN, Pittsburgh.
To Camp Hancock, Ga., base hospital, Lieut. A. H. MURRAY, Sayre.
To Camp Leach, D. C., Lieut. C. L. BOWMAN, Pittsburgh.
To Camp McClellan, Ala., base hospital, for instruction, Capt. H. S. FISH, Sayre.
To Camp Meade, Md., Lieuts. W. J. STEIN, Armore; A. H. BUNSHAW, Erie; V. A. WILLIAMS, Pittsburgh. Base hospital, for instruction, Capt. S. D. MOLYNEAUX, Philadelphia.
To Camp Pike, Ark., base hospital, Lieut. E. S. WALLS, Pittsburgh.
To Camp Sevier, S. C., Lieut. F. W. RUDOLPH, Pittsburgh.
To Camp Shelby, Miss., base hospital, Capt. C. S. REBUCK, Harrisburg.
To Camp Sheridan, Ala., base hospital, Capt. F. P. STECK, Shamokin. Base hospital, for instruction, Lieut. T. E. TEACH, Lock Haven.
To Camp Sherman, Ohio, base hospital, for instruction, Lieut. G. S. HACKETT, Belle Vernon.
To Camp Wheeler, Ga., base hospital, for instruction, Capt. T. L. CHASE, Philadelphia.
To Fort Oglethorpe for instruction, Capts. F. M. SUMMERVILLE, Oil City; G. M. FERGUSON, C. P. KATZENSTEIN, Philadelphia;

B. A. BOOTH, C. C. MARSHALL, Pittsburgh; Lieuts. J. C. ATWELL, Butler; P. A. LONERGAN, Dickson City; H. N. THISSELL, C. V. VEDDER, Philadelphia; J. J. KVATSAK, T. F. MOORE, Pittsburgh; M. E. GRUVER, Reading; A. P. GARDNER, E. A. McLAINE, Scranton; S. A. RUBEN, Washington; A. E. TORRENS, West View; H. S. FLOYD, Wilkinsburg; H. B. JONES, Woodlawn.

To Mineola, N. Y., Hazelhurst Field, for instruction, Capt. S. H. HORNE, Philadelphia.

To Hoboken, N. J., Lieuts. H. E. MOORE, Ambridge; W. P. GEMMILL, Monessen; W. J. DAVIDSON, New Castle.

To Newport News, Va., Lieuts. J. P. DOUGHERTY, Ashley; R. O. BLACKLOCK, McKeesport; W. T. DODDS, Pittsburgh; P. E. BIGGINS, Sharpsville; J. H. CORWIN, Washington.

South Carolina

To Camp Lee, Va., Lieut. J. E. LUCAS, Great Falls.

To Camp Sevier, S. C., base hospital, for instruction, Capt. J. H. HUNTER, Spartanburg.

To Fort Oglethorpe for instruction, Lieuts. H. J. STUCKY, Bamberg; J. C. SEASE, Charleston; J. L. MARSHALL, Greenwood; C. H. ESDORN, Walterboro.

South Dakota

To Fort Riley for instruction, Lieut. W. S. CHAPMAN, Mellette.

Tennessee

To Camp Sevier, S. C., base hospital, Capt. F. L. YOUNG, Knoxville.

To Fort Oglethorpe for instruction, Capts. R. O. KIBLER, Cleveland; W. O. FLOYD, Nashville; Lieuts. W. J. HEWSON, Ducktown; E. H. BAIRD, J. B. BERRY, D. L. FLANARY, Dyersburg; G. C. HUTSON, Knoxville; J. W. MASON, C. W. ROBINSON, Memphis; E. A. GILBERT, St. Elmo; R. H. RUBLE, Washington College.

To Newport News, Va., Lieut. R. B. FLANIKEN, Brunswick.

Texas

To Camp Bowie, Texas, base hospital, Capt. W. G. COOK, Fort Worth.

To Camp Cody, N. M., base hospital, Capt. J. W. McLAUGHLIN, Austin.

To Camp Kelly, Texas, Capt. S. C. GAGE, Waco; Lieuts. D. A. MOHLER, Dallas; E. A. MONTENYOHL, El Paso.

To Camp Shelby, Miss., base hospital, Lieut. M. H. BOERNER, Austin.

To Camp Travis, Texas, Lieut. P. A. BAZE, Mason.

To Denver, Colo., Lieuts. J. W. POULTER, Dallas; J. L. McKNIGHT, El Paso.

To Fort Oglethorpe for instruction, Capts. T. R. BLACK, Paris; R. Y. LACY, Pittsburgh; M. W. SHERWOOD, Temple; Lieuts. W. J. JINKINS, Galveston; J. H. BURNETT, Kopperl; S. C. BALL, New Boston.

To Fort Riley for instruction, Capt. J. T. LAWSON, Bowie; Lieuts. C. G. STRICKLIN, Clarendon; H. ROWE, Denton; L. O. FOSTER, Fort Worth; T. F. YATER, Godley; J. M. DOSS, Pharr; E. W. MOSS, Quail; J. M. VAN NESS, San Marcos; W. P. DINGLE, Valley Mills.

To Fort Sam Houston, Texas, Lieut. E. V. DICKEY, Dallas.

To New Haven, Conn., Yale Army Laboratory School, for instruction, Capt. L. YATER, Cleburne.

To report to the commanding general, Southern Department, Lieut. W. F. HOLLAND, Santa Ana.

Utah

To Fort Riley for instruction, Capt. S. W. BADCON, Ogden.

Vermont

To Camp Devens, Mass., base hospital, Capt. L. A. NEWCOMB, Montpelier.

To Fort Oglethorpe for instruction, Lieut. C. E. WARD, Hartland.

To Hoboken, N. J., Lieut. H. P. GREENE, Brattleboro.

Virginia

To Camp Greene, N. C., Capt. C. R. ANDERSON, Winchester; Lieut. G. G. HANKINS, Phoebus.

To Camp Sevier, S. C., base hospital, Lieut. E. L. RAWLS, Suffolk.

To Fort Oglethorpe for instruction, Capts. J. A. RICE, Heathsville; O. H. McCLUNG, Lexington; J. D. OSBORNE, Petersburg; Lieut. L. P. MILLIGAN, Hopewell.

To Newport News, Va., Capts. J. T. BUXTON, Newport News; W. P. JONES, Urbanna; Lieut. S. L. STALLARD, Newport News.

To report to the commanding general, Southeastern Department, Lieut. C. P. OBENSCHAIN, Kerrs Creek.

Washington

To Camp Lewis, Wash., Capt. W. A. SMITH, Centralia; Lieuts. A. POSKA, Seattle; F. H. CARVER, Waitsburg. Base hospital for instruction, Capt. W. S. DURAND, Everett.

West Virginia

To Camp Colt, Pa., Lieut. C. N. REGER, Vandalia.

To Camp Meade, Md., Lieuts. A. H. HOGE, Bluefield; G. C. BLAKE, Tunnelton.

To Camp Sevier, S. C., Lieut. H. S. KEISTER, Fairmont.

To Fort Oglethorpe for instruction, Capts. A. M. FREDLOCK, Elkins; L. A. WILLIAMS, Huntington; Lieuts. D. V. SMITH, Letart; M. W. VIEWEG, Wheeling.

To Newport News, Va., Capt. E. T. W. HALL, Freemansburg; Lieut. A. A. SCHERR, Eglon.

Wisconsin

To Fort Oglethorpe for instruction, Capt. I. G. THOMPSON, Eau Claire.

To Fort Riley for instruction, Capt. L. P. A. VALENTINE, Milwaukee; Lieuts. R. CAHOON, Baraboo; A. J. WIESENDER, Berlin; C. E. MYERS, Milladore; R. F. BRAUN, P. J. MERTEN, Milwaukee; J. M. CONWAY, Spring Valley.

To New Haven, Conn., Yale Army Laboratory School, for instruction, Lieut. L. R. FOWSER, Manawa.

Wyoming

To Fort Riley for instruction, Lieut. B. SHIPMAN, Rock Springs.

ORDERS TO OFFICERS OF THE MEDICAL CORPS, U. S. ARMY

Alabama

To Camp Custer, Mich., to examine the command for cardiovascular diseases, from Lakewood, Capt. H. W. BASS, Gadsden.

To Camp Hancock, Ga., base hospital, for instruction, from Fort Oglethorpe, Capt. G. H. WINTHROP, Mobile.

To Camp Jackson, S. C., base hospital, for instruction, from Fort Oglethorpe, Capt. N. P. COCKE, Birmingham.

To Camp Joseph E. Johnston, Fla., base hospital, for instruction, from Fort Oglethorpe, Lieut. J. R. CHISOLM, Marion Junction.

To Fort Bliss, Texas, from Fort Oglethorpe, Lieut. W. F. HAMILTON, Pell City.

Arkansas

To Camp Crane, Pa., mobile hospital, from Fort Oglethorpe, Lieut. R. R. DALE, Texarkana.

To Camp Hancock, Ga., base hospital, from Fort Oglethorpe, Capt. W. D. JUDKINS, Little Rock.

To Camp Zachary Taylor, Ky., base hospital, from Fort Oglethorpe, Lieut. F. L. WILSON, Hermitage.

To Hoboken, N. J., from Camp Upton, Capt. C. P. WILSON, JR., Fort Smith.

California

To Camp A. A. Humphreys, Va., from Newport News, Capt. J. H. PARKINSON, Sacramento.

To Camp Crane, Pa., evacuation hospital, from San Francisco, Major C. G. TOLAND, Los Angeles.

To Camp Fremont, Calif., to examine the command for nervous and mental diseases, from Mendocine, Capt. J. A. COLLIE, La Manda Park.

To Camp Meade, Md., evacuation hospital, from Fort Oglethorpe, Lieut. D. E. SHEA, Los Angeles.

To Fort Benjamin Harrison, base hospital, from Camp Lewis, Lieut. W. A. REED, Covina.

To Fort Leavenworth, Kan., Lieut. C. E. EARLY, Los Angeles.

To Pittsburgh, Pa., from Camp Lewis, Capt. H. J. PRUETT, San Francisco.

To Rochester, Minn., Mayo Clinic, for instruction, and on completion *to Camp Pike, Ark.*, base hospital, for instruction, from Fort Riley, Capt. R. SMART, Coronado.

Canal Zone

To Camp Jackson, S. C., base hospital, from Camp Beauregard, Major W. M. JAMES, Ancon.

To Camp Shelby, Miss., base hospital, for instruction, Lieut. L. M. DRENNAN, Ancon City.

Colorado

To Camp Sherman, Ohio, base hospital, for instruction, Lieut. G. L. SHARP, Colorado Springs.

Connecticut

To Camp Hancock, Ga., base hospital, from Fort Oglethorpe, Lieut. P. H. ROGERS, New Haven.

District of Columbia

To Camp McClellan, Ala., from Washington, Lieut.-Col. A. W. SCHOENLEBER.

To Camp Meade, Md., from Walter Reed General Hospital, Capt. W. J. MANNING, Washington.

To Camp Shelby, Miss., from Washington, Lieut.-Col. J. T. AYDELOTTE.

To Camp Sherman, Ohio, base hospital, for instruction, from Fort Oglethorpe, Lieut. J. B. G. CUSTIS, Washington.

To Fort Oglethorpe for instruction, Lieut. W. N. LIPSCOMB, Washington.

To Fort Sam Houston, Texas, as department surgeon, Col. W. H. WILSON.

To Hoboken, N. J., from the Surgeon-General's Office, Major-Gen. R. E. NOBLE, Lieut.-Cols. J. S. COULTER, W. L. HART.

To Walter Reed General Hospital, D. C., from Fort Oglethorpe, Lieut. D. B. MOFFETT, Washington.

Florida

To Rockefeller Institute for instruction in the treatment of infected wounds, and on completion *to Camp Sherman, Ohio*, base hospital, for instruction, from Fort Oglethorpe, Capt. E. S. ESTES, St. Augustine.

Georgia

To Fort Des Moines, Iowa, base hospital, for instruction, from Fort Oglethorpe, Capt. W. L. COOKE, Columbus.

To Fort Oglethorpe for instruction, Lieuts. T. STARR, Calhoun; J. R. McMICHAEL, Quitman.

To Fort Sam Houston, Texas, base hospital, for instruction, from Fort Oglethorpe, Capt. J. D. MAGNET, Atlanta.

To French Lick, Ind., from Camp Wheeler, Lieut.-Col. R. W. BLISS.

To Hampton, Va., Langley Field, Lieuts. J. P. KENNEDY, Atlanta; W. H. WHITTENDALE, Norman Park.

To report to the commanding general, Southern Department, Lieut. T. M. VORBRINCK, Savannah.

The following order has been revoked: *To Camp Wheeler, Ga.*, from Fort Oglethorpe, Lieut. T. M. STEWART, Atlanta.

Illinois

To Camp Abraham Eustis, Va., from Camp Jessup, Lieut. L. B. CLINTON, Chicago.

To Camp Crane, Pa., from Camp Pike, Capt. A. H. CURTIS, Chicago. Mobile hospital, from Fort Oglethorpe, Lieut. E. J. BURKE, LaSalle.

To Camp Custer, Mich., base hospital, Lieut. D. HOLDEN, Chicago.

To Camp Grant, Ill., base hospital, for instruction, Lieut. M. B. KARATZ, Chicago.

To Camp Greene, N. C., to examine the command for cardiovascular diseases, from Edgewood, Md., Lieut. A. SUMMERS, Oak Forest.

To Camp Hancock, Ga., base hospital, from Camp Logan, Capt. H. A. WARE, Chicago; from Fort Oglethorpe, Capts. R. L. TRUITT, Naperville; W. E. POTTER, Oak Park; Lieuts. J. R. SMITH, Chicago; J. A. BOZARTH, East St. Louis.

To Camp Jackson, S. C., base hospital, Capt. W. H. BUHLIG, Chicago.

To Camp Joseph E. Johnston, Fla., base hospital, from Fort Oglethorpe, Capt. W. R. FRINGER, Rockford.

To Camp Logan, Texas, base hospital, for instruction, from Fort Oglethorpe, Capt. L. P. KUHN; Lieut. H. HOFMAN, Chicago.

To Camp MacArthur, Texas, base hospital, for instruction, from Fort Oglethorpe, Capt. J. E. STANTON, Chicago.

To Camp Meade, Md., evacuation hospital, from Fort Oglethorpe, Capt. C. B. RIPLEY, Galesburg.

To Camp Pike, Ark., base hospital, from Camp Beauregard, Capt. C. W. COMPTON, Springfield.

To Camp Shelby, Miss., base hospital, for instruction, from Fort Oglethorpe, Capt. W. A. PLICE, Chicago.

To Camp Sheridan, Ala., from Camp Forrest, Major T. P. FOLEY, Chicago.

To Camp Sherman, Ohio, base hospital, for instruction, Lieuts. J. W. KELLY, Chicago; E. A. WELDEN, Wheaton.

To Camp Zachary Taylor, Ky., base hospital, for instruction, Capt. R. T. VAUGHAN, Chicago; from Fort Riley, Lieut. P. S. CLARK, Chicago.

To Columbus Barracks, Ohio, from Camp Meade, Lieut. A. C. PRUNER, Chicago.

To Dansville, N. Y., from Fort Oglethorpe, Capt. A. ALGUIRE, Belvidere.

To Fort Des Moines, Iowa, from Fort Oglethorpe, Lieut. J. MITCHELL, Chicago. Base hospital, for instruction, Lieut. G. W. COX, Litchfield.

To Hoboken, N. J., Lieut. I. H. CAMPBELL, Collison. Base hospital, from Camp Hancock, Lieut. A. J. WEIRICK, Marseilles; from Camp McClellan, Lieut. J. A. DE FREITAS, Springfield.

To Kiser, Va., from Camp Meade, Capt. H. WOOD, Batchtown.

To Rockefeller Institute for instruction in the treatment of infected wounds, and on completion *to Camp Lee, Va.*, base hospital, for instruction, Fort Oglethorpe, Capt. H. D. HULL, Crystal Lake. On completion *to Camp Meade, Md.*, base hospital, for instruction, Lieuts. P. E. GREENLEAF, Bloomington; O. L. EDWARDS, Roodhouse.

To Waynesville, N. C., from New Haven, Capt. W. H. WATTERSON, Chicago.

The following orders have been revoked: *To Camp Crane, Pa.*, evacuation hospital, Lieut. C. F. HARRIS, Chicago. *To Camp Joseph E. Johnston, Fla.*, from Fort Oglethorpe, Capt. S. ROSENBLATT, Chicago.

Indiana

To Boston, Mass., Harvard Graduate School of Medicine, for instruction, from Fort Oglethorpe, Lieut. R. S. KEMP, Kentland.

To Camp Crane, Pa., evacuation hospital, from Fort Oglethorpe, Lieut. C. R. BASSLER, Elkhart.

To Camp Grant, Ill., base hospital, for instruction, Major D. C. PEYTON, Jefferson.

To Camp Meade, Md., from Fort Oglethorpe, Capt. H. N. SWEZEY, Lafayette. Base hospital, from Fort Oglethorpe, Lieut. E. L. SCHAIBLE, Gary.

To Camp Upton, N. Y., from Fort Oglethorpe, Lieut. A. R. KERR, Attica.

To Fort Oglethorpe, as instructor, from Fort Benjamin Harrison, Capt. F. M. WHISLER, Wabash. For instruction, from Ann Arbor, Capt. C. C. FUNK, New Albany.

To Hampton, Va., Langley Field, Capt. A. W. WARMAN, Clinton.

To New York, Bellevue Hospital, for instruction, from Fort Oglethorpe, Capt. B. W. CHIDLAW, Hammond.

To Pittsburgh, Pa., from Camp Sevier, Capt. W. E. GEORGE, Indianapolis.

To Rockefeller Institute for instruction in the treatment of infected wounds, and on completion *to Camp A. A. Humphreys, Va.*, base hospital, for instruction, from Fort Oglethorpe, Capt. F. R. CLAPP, South Bend. On completion *to Camp Lee, Va.*, base hospital, for instruction, C. H. McCULLY, Logansport.

To Walter Reed General Hospital, D. C., Lieut H. L. BELL, Knox.

The following order has been revoked: *To Fort Oglethorpe*, base hospital, from Camp Dodge, Lieut. E. N. BENNETT, Kokomo.

Iowa

To Camp Crane, Pa., mobile hospital, from Camp Jackson, Major P. B. McLAUGHLIN, Sioux City.

To Camp Greene, N. C., base hospital, from Southern Department, Capt. E. M. P. SWARD, Glenwood.

To Camp Hancock, Ga., base hospital, from Fort Oglethorpe, Capt. J. C. MURPHY, Davenport.

To Camp Upton, N. Y., base hospital, from Fort Oglethorpe, Lieut. W. H. JOHNSTON, Muscatine.

To Lansing, Mich., Michigan Agriculture College, Lieut. H. L. BRIDGMAN, Columbia.

To Fort Oglethorpe, base hospital, from Camp Wheeler, Lieut. H. L. VON LACKUM, Iowa City. For instruction, Lieut. J. O. MURPHY, Eldon.

To Garden City, N. Y., from Fort Sill, Major T. L. LONG, Woodward.

To Rochester, Minn., Mayo Clinic, for instruction, and on completion *to Camp Grant, Ill.*, base hospital, for instruction, from Fort Riley, Lieut. F. P. WINKLER, Sibley. On completion *to Camp Zachary Taylor, Ky.*, base hospital, for instruction, from Fort Riley, Capt. W. RUML, Cedar Rapids.

To Washington, D. C., St. Elizabeth's Hospital, for instruction, from Camp Travis, Lieut. J. I. MARKER, Centerville.

Kansas

To Camp Crane, Pa., mobile hospital from Walter Reed General Hospital, Capt. H. WILKINSON, Kansas City.

To Camp Zachary Taylor, Ky., base hospital, from Fort Oglethorpe, Capt. W. H. CARTER, Wichita.

To Fort Oglethorpe, evacuation hospital, from Fort Riley, Capt. H. ATKINS, Pratt. For instruction, from Fort Riley, Lieut. W. S. PROUT, Concordia.

To Fort Riley for instruction, Lieut. J. E. GRAF, Salina.

To Rochester, Minn., Mayo Clinic, for instruction, and on completion *to Camp Dodge, Iowa*, base hospital, for instruction, from Fort Riley, Lieut. R. B. EARP, Eldorado.

To Rockefeller Institute for instruction in the treatment of infected wounds, and on completion *to Camp Sherman, Ohio*, base hospital, for instruction, from Fort Oglethorpe, Lieut. A. E. GARDNER, Wichita.

Kentucky

To Hoboken, N. J., Lieut. P. T. SKAGGS, Louisville.

Louisiana

To Camp Crane, Pa., from Fort Oglethorpe, Capt. W. B. CHAMBERLIN, Baton Rouge. From the Surgeon-General's Office, Major S. M. D. CLARK, New Orleans.

To Camp Greene, N. C., base hospital, from Fort Oglethorpe, Capt. E. HOLLOWAY, Plaquimine.

To Fort McPherson, Ga., for instruction, Lieut. C. L. GAULDEN, Elizabeth.

To Fort Oglethorpe for instruction, Lieut. O. P. DALY, Jr., Lafayette.

To New Orleans, La., Quartermaster's Department, Major F. W. FARHAM, New Orleans.

Maine

To Camp Devens, Mass., to examine the command for nervous and mental diseases, from Boston, Lieut. F. E. ROWE, Augusta.

To Camp Hancock, Ga., base hospital, from Fort Oglethorpe, Lieut. O. C. MOULTON, South Windham.

Maryland

To Camp Meade, Md., base hospital, from Camp Leach, Lieut. W. P. FINNEY, Baltimore.

To Edgewood, Md., Edgewood Arsenal, from Camp Meade, Lieut.-Col. G. E. LEWIS, Rockville.

To Rochester, Minn., Mayo Clinic, for instruction, and on completion *to his proper station*, from Fort Riley, Capt. W. B. PERRY, Baltimore.

Massachusetts

To Boston, Mass., Parker Hill, Lieut. L. M. SPEAR, Boston.

To Brockton, Mass., and on completion *to Camp Devens, Mass.*, from Fort Oglethorpe, Capts. J. F. CALLAHAN, J. J. McNAMARA, Lieut. J. L. MARA, Brockton.

To Camp Beauregard, La., base hospital, from Fort Bliss, Lieut. A. N. FREGEAU, Fitchburg.

To Camp Crane, Pa., from New York, Lieut. L. S. KEMP, Canton; from Richmond, Capt. G. L. TOBEY, Boston. Mobile hospital, from Fort Oglethorpe, Capt. W. E. HUNT, Malden; from Williamsbridge, Lieut. H. J. LUPIEN, Brockton.

To Camp Devens, Mass., base hospital, from Camp Cody, Lieut. W. H. MERRILL, Lawrence; from Fort Oglethorpe, Capt. H. H. FITZSIMMONS, Boston. Base hospital, for instruction, Lieut. D. S. ADAMS, Boston.

To Camp Dix, N. J., base hospital, from Lakewood, Capt. J. A. CECONI, Boston.

To Camp Gordon, Ga., base hospital, from Camp Hancock, Lieut. F. W. HODGDON, Jr., Boston.

To Camp Greene, N. C., base hospital, from Camp Gordon, Capt. G. A. PIERCE, Tewksbury.

To Camp Hancock, Ga., base hospital, from Fort Oglethorpe, Lieuts. H. E. DIEHL, Quincy; G. L. STEELE, West Springfield.

To Camp Zachary Taylor, Ky., base hospital, from Fort Oglethorpe, Lieuts. C. F. WILCOX, Jr., East Boston; C. G. YERBURY, Springfield.

To Minneapolis, Minn., University of Minnesota, from Rantoul, Capt. J. G. JENNINGS, Boston.

To New York, Cornell Medical College, for instruction, Capt. C. WHELAN, Hingham.

Michigan

To Camp Crane, Pa., mobile hospital, from Fort Oglethorpe, Lieut. A. C. HALL, Detroit.

To Camp Greene, N. C., base hospital, from Boston, Capt. H. W. LONG, Escanaba.

To Camp Hancock, Ga., base hospital, from Fort Oglethorpe, Capt. G. P. MYERS, Detroit.

To Camp Lee, Va., base hospital, from Camp A. A. Humphreys, Capt. C. L. BARBER, Lansing.

Minnesota

To Boston, Mass., Harvard Graduate School of Medicine, for instruction, from Fort Oglethorpe, Lieut. E. O. SWANSON, St. Paul; from Fort Riley, Lieut. F. H. NEHER, St. Paul.

To Camp Crane, Pa., mobile hospital, from Camp Wadsworth, Lieut. S. O. BLACK, Rochester.

To Camp Dodge, Iowa, base hospital, from Fort Riley, Capt. W. W. LEWIS, St. Paul. Base hospital, for instruction, Capt. A. H. PARKS, Minneapolis.

To Camp Grant, Ill., base hospital, for instruction, Capt. C. I. OLIVER, Graceville.

To Camp Hancock, Ga., base hospital, from Fort Oglethorpe, Lieut. G. McCREIGHT, Albert Lea.

To Camp Lewis, Wash., to examine the command for nervous and mental diseases, from San Francisco, Lieut. A. F. STRICKLER, Sleepy Eye.

To Camp Zachary Taylor, Ky., base hospital, from Fort Oglethorpe, Capt. C. A. LESTER, Winona.

To Fort McPherson, Ga., for instruction, Capt. A. W. SHALEEN, Hallock.

To Fort Oglethorpe for instruction, Lieuts. C. M. CLARK, P. A. O'LEARY, Rochester.

To Mineola, N. Y., Hazelhurst Field, from St. Paul, Capt. A. S. FLEMING, Minneapolis.

Mississippi

To Camp Greene, N. C., base hospital, from Fort Oglethorpe, Capt. J. B. STONE, Belen.

To Camp Pike, Ark., evacuation hospital, from Fort Oglethorpe, Capt. G. G. ASH, Lexington.

To Camp Sheridan, Ala., Lieut. G. W. BOUNDS, Meehan Junction.

To Camp Sherman, Ohio, base hospital, from Fort Oglethorpe, Lieut. D. C. MONTGOMERY, Greenville.

To Fort Oglethorpe for instruction, Lieut. T. R. McCARLEY, Okolona.

Missouri

To Camp Crane, Pa., mobile hospital, from Fort Oglethorpe, Lieut. O. F. FLADER, St. Louis.

To Camp Greene, N. C., base hospital, from Fort Oglethorpe, Capt. C. S. CAPELL, Kansas City.

To Camp McClellan, Ala., base hospital, for instruction, Lieut. R. W. JANSON, St. Louis.

To Camp Zachary Taylor, Ky., base hospital, from Fort Oglethorpe, Capt. W. M. WHEELER, Sedalia; from Jefferson Barracks, Lieut. J. C. DONAHUE, St. Louis.

To Fort Benjamin Harrison, base hospital, from Camp Dodge, Capt. D. E. SINGLETON, Clarence.

To Fort Leavenworth, Kan., Lieut. B. R. TREASURE, McFall.

To Fort McPherson, Ga., for instruction, Capt. C. D. CANTRELL, Kansas City.

To Fort Oglethorpe, evacuation hospital, from Camp MacArthur, Capt. S. S. BURNS, St. Louis; from Camp Shelby, Lieut. A. L. HERTEL, St. Louis. For instruction, Capt. P. I. LEONARD, St. Joseph; from Boston, Lieut. A. M. GOLDMAN, Kansas City.

To Fort Riley for instruction, Lieut. D. L. ROBESON, Kansas City. *To examine the command* for nervous and mental diseases, from Central Department, Capt. S. D. REYNOLDS, Gouler.

To Fort Sam Houston, Texas, base hospital, for instruction, from Fort Oglethorpe, Lieut. A. M. GREGG, Joplin.

To Fort Sheridan, Ill., base hospital, from Camp MacArthur, Major J. C. MORFIT, St. Louis.

To Jefferson Barracks, Mo., from St. Louis, Major H. W. LOEB, St. Louis.

To Pittsburgh, Pa., from Camp Lewis, Lieut. H. A. CALVERT, Smithville.

To Rochester, Minn., Mayo Clinic, for instruction, and on completion *to Camp Dodge, Iowa*, base hospital, for instruction, from Fort Riley, Capt. P. S. TATE, Farmington.

To Rockefeller Institute for instruction in the treatment of infected wounds, and on completion *to Camp Devens, Mass.*, base hospital, for instruction, from Fort Oglethorpe, Lieut. C. S. STRATTON, Roscoe.

Montana

To Camp Crane, Pa., base hospital, from Camp Lewis, Capt. E. F. DODDS, Missoula. Evacuation hospital, from Camp Fremont, Lieut. W. G. PALM, Joplin.

To Rockefeller Institute for instruction in the treatment of infected wounds, and on completion *to Camp Dix, N. J.*, base hospital, for instruction, from Fort Oglethorpe, Capt. O. T. STRATTON, Cascade.

Nebraska

To Camp Dodge, Iowa, base hospital, Lieut. B. M. KULLY, Omaha.

To Fort Des Moines, Iowa, from Fort Crook, Major E. L. DELANNEY, Omaha.

To Fort Oglethorpe for instruction, Lieut. O. R. PLATT, Hebron.

To Fort Riley, base hospital, from Fort Oglethorpe, Capt. J. J. SNIPES, Lincoln.

To Hoboken, N. J., base hospital, from Camp Zachary Taylor, Capt. C. H. CAMPBELL, Columbus.

To Rochester, Minn., Mayo Clinic, for instruction, and on completion *to Camp Grant, Ill.*, base hospital, for instruction, from Fort Riley, Capt. C. L. FAHNESTOCK, McCook.

To Rockefeller Institute for instruction in the treatment of infected wounds, and on completion *to Camp Greene, N. C.*, from Fort Oglethorpe, Capt. W. T. CARSON, Hastings.

Nevada

To Camp Crane, Pa., evacuation hospital, from Camp Kearney, Capt. E. K. SMITH, Lovelock.

New Hampshire

To Camp Devens, Mass., from Fort Oglethorpe, Lieut. G. A. TREDICK, Portsmouth.

To Rockefeller Institute for instruction in the treatment of infected wounds, and on completion *to Camp Devens, Mass.*, base hospital, for instruction, from Fort Oglethorpe, Lieut. E. H. THOMPSON, Hampton.

To Walter Reed General Hospital, D. C., from Fort Oglethorpe, Lieut. F. B. CLOW, Wolfeboro.

New Jersey

To Camp Abraham Eustis, Va., to examine the command for nervous and mental diseases, from Washington, Lieut. E. H. SNAVELY, Cedar Grove.

To Camp Greene, N. C., base hospital, from Camp Jackson, Major C. E. SUTPHEN, Newark; from Fort Oglethorpe, Lieut. M. E. STREEN, Newark.

To Camp Hancock, Ga., base hospital, from Fort Oglethorpe, Capt. C. R. NEARE, East Orange; Lieut. R. D. VREELAND, Passaic.

To Fort Oglethorpe, base hospital, from Camp Jackson, Lieut. I. S. INGBER, Secaucus.

New York

To Army Medical School for instruction, from Hoboken, Lieut. T. M. CALLADINE, Perry.

To Camp Cody, N. M., for instruction, from Fort Slocum, Major R. E. PARRISH.

To Camp Crane, Pa., base hospital, from Camp Lewis, Capt. R. M. JONES, New York. Mobile hospital, from Fort Oglethorpe, Lieut. A. B. BRUNER, R. V. FUNSTEN, New York.

To Camp Devens, Mass., base hospital, for instruction, Lieut. H. HARRIS, New York.

To Camp Hancock, Ga., base hospital, from Camp Jackson, Capt. J. H. EVANS, Virgil; from Fort Oglethorpe, Lieuts. C. A. LEE, Brooklyn; E. W. PRESLEY, Staten Island. Base hospital, for instruction, Lieut. N. H. GOLDBERG, New York.

To Camp Jackson, S. C., base hospital, Lieut. M. GLEICH, New York.

To Camp Lee, Va., base hospital, Lieut. J. RYBACK, Brooklyn.

To Camp Logan, Texas, from Fort Oglethorpe, Lieut. O. J. COOK, New York.

To Camp MacArthur, Texas, base hospital, for instruction, from Fort Oglethorpe, Lieut. I. E. SUMNER, Brooklyn.

To Camp McClellan, Ala., base hospital, for instruction, from Fort Oglethorpe, Lieut. E. W. WILKINS, Albany.

To Camp Meade, Md., from Syracuse, Capt. D. E. BRACE, New York. Base hospital, for instruction, Lieut. D. M. FULLER, New York. Evacuation hospital, from Camp Laurel, Lieut. D. G. DUDLEY, Endicott; from Fort Oglethorpe, Lieut. C. L. LARKIN, New York.

To Camp Wheeler, Ga., from Washington, Major H. R. GAYLORD, Buffalo.

To Camp Zachary Taylor, Ky., base hospital, from Camp Greene, Capt. J. R. SWANICK, Saratoga Springs.

To Chaunte Field, Rantoul, Ill., as flight surgeon, from Hazelhurst Field, Capt. W. A. SCRUTON, New York.

To Fort Benjamin Harrison, from Southern Department, Capt. A. C. CALISCH, Oswego.

To Fort Oglethorpe, from Knoxville, Tenn., Lieut. L. JACOBS, Brooklyn. Base hospital, from Camp Wheeler, Lieut. R. G. BLOOD, New York. For instruction, Lieuts. J. BECKENSTEIN, Brooklyn; I. GREENBERG, J. G. J. GRIMLEY, New York.

To Hoboken, N. J., from Fort Porter, Capt. A. J. CAPRON, Oswego; from Washington, Lieut. T. J. VOSBURGH, Warwick. Base hospital, from Camp McClellan, Lieut. S. S. ARLUCK, New York.

To Lakewood, N. J., Lieuts. L. T. MANN, New York.; P. J. WHITE, Ja., Staten Island; from New Haven, Capt. C. W. FIELD, New York.

To New York, Neurological Institute, for instruction, Lieut. J. RESNIK, New York.

To Otisville, N. J., from Fort McPherson, Capt. R. E. PLUNKETT, Whitehall.

To Pittsburgh, Pa., Lieut. A. VALENSI, New York.

To Rahway, N. J., from Boston, Lieut. H. F. MORRISON, Tuxedo Park.

To Rochester, Minn., Mayo Clinic, for instruction, and on completion *to Camp Sherman, Ohio*, base hospital, for instruction, from Fort Riley, Lieut. F. A. SHARPE, New York.

To Rockefeller Institute for instruction in the treatment of infected wounds, and on completion *to Camp Meade, Md.*, base hospital, for instruction, from Fort Oglethorpe, Lieut. J. L. KINNER, Elmira.

To Walter Reed General Hospital, D. C., from Fort Oglethorpe, Lieut. H. L. PRINCE, Rochester.

To Washington, D. C., from Camp MacArthur, Major J. T. SPRAGUE, Staten Island; from Walter Reed General Hospital, Lieut. H. P. SAWYER, Troy.

To West Point, N. Y., to give orthopedic instruction, and on completion *to Fort Hancock, N. J.*, from Plattsburg Barracks, Major B. H. WHITBECK, New York.

To Williamsbridge, N. Y., from Camp Sheridan, Capt. S. W. ROOF, New York.

The following order has been revoked: *To Fort Oglethorpe* for instruction, Lieut. A. WINKELSTEIN, Syracuse.

North Carolina

To Camp Sherman, Ohio, from Fort Oglethorpe, Lieut. R. B. WILKINS, Raeford.

To Lakewood, N. J., Lieut. D. H. NISBET, Charlotte.

North Dakota

To Camp Lewis, Wash., for instruction, from Camp Dodge, Capt. A. M. FISHER, Bismark.

Ohio

To Austin, Texas, State University, from Fort Sill, Lieut. F. S. VAN DYKE, Columbus.

To Camp A. A. Humphreys, Va., from New Haven, Lieut. A. J. FOX, Cincinnati.

To Camp Abraham Eustis, Va., for instruction, from Columbus Barracks, Major L. J REGAN

To Camp Crane, Pa., mobile hospital, from Fort Oglethorpe, Capt. E. W. FISHER, Portage; Lieut. F. F. DAVIS, East Liverpool.

To Camp Custer, Mich., as camp surgeon, from Camp Pike, Lieut.-Col. E. F. McCAMPBELL, Columbus.

To Camp Greene, N. C., base hospital, from Camp Shelby, Lieut. C. V. DAVIS, Cleveland.

To Camp Hancock, Ga., base hospital, from Camp Bowie, Capt. H. M. OSBORNE, Youngstown; from Fort Oglethorpe, Lieut. T. HULICK, Cincinnati.

To Camp Jackson, S. C., base hospital, for instruction, from Fort Oglethorpe, Lieut. J. K. HAMILTON, Youngstown.

To Camp McClellan, Ala., base hospital, for instruction, Lieut. H. A. BAUGHN, Washington C. H.

To Camp Sherman, Ohio, from Army Medical School, Lieut. V. R. TURNER, Newark. Base hospital, from Fort Oglethorpe, Lieut. P. M. SPURNEY, Cleveland. Base hospital, for instruction, Lieut. O. G. GRADY, Orrville.

To Camp Zachary Taylor, Ky., base hospital, for instruction, Lieut. F. J. GALLAGHER, Cleveland.

To Fort Oglethorpe, base hospital, from Army Medical School, Major R. D. MADDOX, Cincinnati.

To Hampton, Va., Langley Field, Lieut. J. W. CAINES, Cuyahoga Falls.

To Hoboken, N. J., Lieut. F. H. MIKETTA, Cincinnati.

To Marshall, Texas, Bishop and Wiley College, Lieut. J. R. FINLEY, Dayton.

To Philadelphia, Pa., Spring Garden Institute, from Camp Meade, Lieut. C. B. TANNER, Columbus.

To Springfield, Mo., Drury College, from Madison, Wis., Lieut. B. J. SAWICKI, Cleveland.

Oklahoma

To Camp Beauregard, La., base hospital, for instruction, Capt. J. M. ALFORD, Oklahoma City.

Pennsylvania

To Biltmore, N. C., from Lakewood, Major J. B. McCREARY, Shippensburg.

To Camp Crane, Pa., mobile hospital, from Fort Oglethorpe, Capt. E. V. KYLE, Christiana.

To Camp Greene, N. C., base hospital, from Camp Wadsworth, Lieut. J. P. HARLEY, Williamsport; from Fort Oglethorpe, Major T. B. CARROLL, Pittsburgh; Lieuts. G. W. CONRAD, Johnstown; A. S. SICKMAN, Lock. Base hospital, for instruction, Lieut. J. M. HIGGINS, Sayre.

To Camp Hancock, Ga., base hospital, from Fort Oglethorpe, Capt. J. A. BROOKE, Philadelphia. Evacuation hospital, from Fort Oglethorpe, Lieut. C. J. McCULLOUGH, Washington.

To Camp Jackson, S. C., base hospital, for instruction, from Fort Oglethorpe, Lieut. J. D. KEIPER, Johnstown.

To Camp Joseph E. Johnston, Fla., base hospital, for instruction, from Fort Oglethorpe, Lieut. K. A. BOWMAN, Johnstown.

To Camp Kearney, Calif., from Southern Department, Major W. H. THOMAS, Philadelphia.

To Camp Lee, Va., base hospital, Lieut. J. C. KNOX, Washington. Base hospital, for instruction, Lieut. O. R. CLOVIS, Jollytown.

To Camp Meade, Md., from Fort Oglethorpe, Lieut. E. P. KITCHEN, Philadelphia. Base hospital, for instruction, Lieut. C. E. CHASE, Doylestown. Evacuation hospital, from Fort Oglethorpe, Major J. S. RODMAN, Philadelphia.

To Camp Shelby, Miss., base hospital, for instruction, Lieut. S. G. BIDDLE, Philadelphia; from Fort Oglethorpe, Lieut. M. PLATT, Philadelphia.

To Camp Sheridan, Ala., base hospital, for instruction, Lieut. P. C. EISEMAN, Latrobe.

To Camp Sherman, Ohio, base hospital, for instruction, from Fort Oglethorpe, Capt. W. L. CAMPBELL, New Castle.

To Camp Zachary Taylor, Ky., base hospital, Major W. PEPPER, Philadelphia; from Camp Gordon, Capt. H. B. CORNELL, Scranton; from Fort Oglethorpe, Lieut. R. J. ASKIN, Pittsburgh.

To Detroit, Mich., Capt. R. W. WATTERSON, Darlington.

To Fort Oglethorpe, evacuation hospital, from Camp Gordon, Capt. A. R. MATHENY, Pittsburgh; from Walter Reed General Hospital, Capt. R. BRENNEMAN, Pittsburgh.

To Fort Riley, base hospital, from Boston, Capt. W. M. HOLTZ, Pittsburgh.

To Fort Slocum, N. Y., as orthopedic surgeon, from Boston, Lieut. C. N. SILMAN, Pittsburgh.

To Hoboken, N. J., base hospital, from Fort Oglethorpe, Lieut. C. T. FARIES, Narbeth.

To Newport News, Va., from Camp Sevier, Capt. M. J. SHIELDS, Scranton.

To Rockefeller Institute for instruction in the treatment of infected wounds, and on completion *to Camp Lee, Va.*, base hospital, for instruction, from Fort Oglethorpe, Capt. L. VAN HORN, Philadelphia. On completion *to Camp Wadsworth, S. C.*, base hospital, for instruction, from Fort Oglethorpe, Capt. J. M. GELWIX, Chambersburg.

Rhode Island

To Camp Zachary Taylor, Ky., base hospital, from Fort Oglethorpe, Capt. A. B. BRADSHAW, Providence.

To New Haven, Conn., Yale Army Laboratory School, for instruction, from Hoboken, Major J. HAMILTON, Jr., Providence.

South Carolina

To Camp Crane, Pa., mobile hospital, from Fort Oglethorpe, Capt. H. W. DESAUSSURE, Charleston.

To Camp Greene, N. C., base hospital, for instruction, Lieut. B. H. BAGGOTT, Columbia.

To Camp Hancock, Ga., base hospital, from Fort Oglethorpe, Lieut. D. H. SMITH, Glenn Springs.

To Fort Oglethorpe, evacuation hospital, from Fort Riley, Lieut. C. B. MILLS, Cross Hill.

To Ithaca, N. Y., Cornell University, from Everman, Texas, Lieut. J. L. BLAIR, Sharon.

To San Antonio, Texas, Kelly Field, as flight surgeon, from Mineola, Major C. W. KOLLOCK, Charleston.

To Williamsbridge, N. Y., for observation and treatment, from Fort Riley, Lieut. E. W. RICHIE, Abbeville.

South Dakota

To Camp Crane, Pa., mobile hospital, from Fort Oglethorpe, Capt. W. D. FARRELL, Aberdeen.

To Fort Oglethorpe for instruction, Lieut. M. C. JOHNSTON, Aberdeen.

Tennessee

To Camp Shelby, Miss., base hospital, for instruction, Lieut. H. D. MILLER, Johnson City.

To Hoboken, N. J., from the Surgeon-General's Office, Lieut.-Col. W. D. HAGGARD, Nashville.

To Lakewood, N. J., Major M. HAASE, Memphis.

Texas

To Camp A. A. Humphreys, Va., base hospital, for instruction, from Fort Oglethorpe, Capt. W. P. CONNALLY, McGregor.

To Camp Beauregard, La., from Camp Zachary Taylor, Capt. J. P. GIBBS, Houston. Base hospital, from Camp Greene, Capt. R. T. MORRIS, Houston.

To Camp Crane, Pa., from Camp Greene, Capt. C. C. GREEN, Houston. Mobile hospital, from Fort Oglethorpe, Lieut. W. C. WEDEMEYER, Galveston; from Fort Sam Houston, Lieut. E. J. BURNS, Carrizo Spring.

To Camp Gordon, Ga., base hospital, for instruction, from Fort Oglethorpe, Capt. D. A. MANN, Beaumont.

To Camp Greene, N. C., base hospital, from Fort Oglethorpe, Lieut. F. J. STANISLAV, Waco.

To Camp Hancock, Ga., base hospital, from Camp MacArthur, Capt. H. R. DUDGEON, Waco; from Fort Oglethorpe, Capt. F. A. PIERCE, Dallas. Base hospital, for instruction, from Fort Oglethorpe, Lieut. W. L. ASKEW, Amarillo.

To Camp Lee, Va., base hospital, for instruction, from Richmond, Lieut. W. L. JACKSON, Dallas.

To Camp MacArthur, Texas, base hospital, for instruction, Major W. M. WOLF, San Antonio.

To Camp McClellan, Ala., base hospital, for instruction, from Fort Oglethorpe, Capt. I. A. WITHERS, Fort Worth.

To Camp Sevier, S. C., base hospital, from Fort Oglethorpe, Lieut. M. M. LANDRUM, Lampasas.

To Camp Shelby, Miss., from Camp Zachary Taylor, Lieut. H. E. BAYLIS, Huntsville.

To Camp Travis, Texas, Lieut. V. M. LONGMIRE, Temple.

To Fort Oglethorpe, base hospital, from Fort Bliss, Lieut. E. TOOMIN, Waco. Evacuation hospital, from Camp Dodge, Lieut. E. C. BRANNON, Waco; from Camp Travis, Capt. M. I. DUNCAN, Dallas. For instruction, Lieut. G. A. PAGENSTECHER, San Antonio. *To Fort Riley* for instruction, Lieut. W. L. PARKER, Temple.

To Walter Reed General Hospital, D. C., for observation and treatment, from Fort Sam Houston, Lieut. R. L. AIGUIER, Dallas.

Virginia

To Camp Abraham Eustis, Va., from Syracuse, Major A. C. COUMBE, Vienna.

To Camp Crane, Pa., from Southern Department, Capt. J. M. LOVE, Norfolk.

To Camp Devens, Mass., from Camp Forrest, Capt. H. J. HAGAN, Roanoke.

To Camp Hancock, Ga., base hospital, from Fort Oglethorpe, Capt. C. T. PIERCE, Litwalton; Lieuts. J. W. TURMAN, Richmond; W. S. SLICER, Roanoke.

To Camp Lee, Va., base hospital, for instruction, Lieut. H. D. HOWE, Hampton.

To Camp Sevier, S. C., base hospital, for instruction, Lieut. C. E. PEERY, Burke's Garden.

To Camp Zachary Taylor, Ky., base hospital, from Fort Oglethorpe, Lieut. B. O. WIRE, Hurley.

To Hoboken, N. J., Capt. R. R. HOSKINS, Mathews.

To Rockefeller Institute for instruction in the treatment of infected wounds, and on completion *to Camp Devens, Mass.*, base hospital, for instruction, from Fort Oglethorpe, Lieut. J. W. DEVINE, Lynchburg. On completion *to Camp Zachary Taylor, Ky.*, base hospital, for instruction, from Fort Oglethorpe, Capt. W. P. HARTMAN, Swoope.

The following order has been revoked: *To Rockefeller Institute* for instruction, Lieut. H. W. BLANTON, Richmond.

Washington

To Camp Crane, Pa., from Camp Lewis, Capt. C. R. McCREERY, Tacoma.

To Camp Custer, Mich., base hospital, for instruction, Capt. J. C. HENDERSON, Seattle.

West Virginia

To Camp Gordon, Ga., base hospital, for instruction, Capt. W. S. FULTON, Wheeling.

To Camp Greene, N. C., base hospital, from Fort Oglethorpe, Lieut. C. H. TRIPPETT, Buckhannon.

To Camp Zachary Taylor, Ky., base hospital, from Fort Oglethorpe, Capt. W. W. ORR, Worthington.

To Pittsburgh, Pa., University of Pennsylvania and Carnegie Institute, Lieut. T. E. ROMINE, Charleston.

Wisconsin

To Camp Hancock, Ga., base hospital, from Fort Oglethorpe, Capt. W. S. DARLING, Milwaukee; Lieut. C. W. LOCKHART, Mellen.

To Fort Oglethorpe, evacuation hospital, from Camp Joseph E. Johnston, Capt. V. F. MARSHALL, Appleton.

To Rahway, N. J., from Boston, Lieut. H. E. BUNDY, Milwaukee.

To Rochester, Minn., Mayo Clinic, for instruction, and on completion *to Fort Des Moines, Iowa*, for instruction, from Fort Riley, Lieut. J. M. ROSS, Bloom City.

ORDERS TO OFFICERS OF THE UNITED STATES PUBLIC HEALTH SERVICE

Surg. B. W. BROWN, directed to attend conventions of social service council of Canada at various places and also local city conventions in the State of Washington, to deliver addresses on venereal disease control.

Surg. L. P. H. BAHRENBERG, proceed to Jefferson City, Mo., for conference with state authorities on venereal disease control.

Surg. G. W. McCOY, proceed to Boston, Mass., and other places deemed advisable for laboratory studies relative to the etiology of influenza and other infectious diseases.

P. A. Surg. W. L. TREADWAY, proceed to Trenton, N. J., and assume charge in connection with state and local authorities of the control of the influenza epidemic.

Asst. Surg. P. M. STEWART, proceed to Boston, Mass., to duty in connection with the control of the spread of influenza.

Asst. Surg. R. R. SAYERS, proceed to Boston, Mass., for duty in connection with the control of the spread of influenza.

Asst. Surg. R. L. DESAUSSURE, proceed to Boston, Mass., for duty in connection with the control of the spread of influenza.

Asst. Surg. H. S. MUSTARD, assume charge of service operations in the District of Columbia in order to properly safeguard the health of the military forces and the government employees.

Asst. Surg. C. E. GIBBS, proceed to Washington, D. C., for duty in measures for the control of influenza.

Pharmacist F. J. HERTY, proceed to Boston, Mass., for duty in connection with the control of the epidemic of influenza.

A. A. Surg. PERCY AHRONS, relieved at Atlanta, Ga., proceed to Raleigh, N. C., for duty in extra-cantonment sanitation.

A. A. Surg. EDWARD B. HELFRICH, proceed to Newport News, Va., for duty in extracantonment sanitation.

A. A. Surg. J. M. BIEDLER, proceed to Richmond, Va., and assume charge of the sanitary work at the government loading plant.

A. A. Surg. EUGENE MATTICE, proceed to Newport News, Va., for duty in extracantonment sanitation.

A. A. Surg. JAMES W. RICHARDS, proceed to Wilmington, Del., for duty in venereal disease control measures.

A. A. Surg. B. F. ROBERTS, relieved at Newport News, Va., proceed to Washington, D. C., for duty in measures for the control of influenza.

A. A. Surg. A. L. SMEDLEY, proceed to Alexandria, Va., for duty in extracantonment sanitation.

Asst. Educational Director DAVID ROBINSON, proceed to necessary points in the states of New York, Ohio, Illinois, Minnesota, Iowa, Nebraska, Wyoming, and Colorado for conference relative to the instructions to drafted men to be carried out under service supervision.

Scientific Asst. W. H. PRICE, relieved at Anniston, Ala., proceed to Augusta, Ga., to assume charge of service operations.

Scientific Asst. SAMUEL SAUNDERS, relieved at Brunswick, Ga., proceed to Washington, D. C., for duty in measures for the control of influenza.

Asst. Epidemiologist C. C. APPLEWHITE, relieved at Englewood, N. J., proceed to Atlanta, Ga., and assume charge of service operations.

Asst. San. Engineer J. G. FOSTER, relieved at Gulfport, Miss., proceed to Fayetteville, N. C., for duty in extracantonment sanitation.

San. Inspector HARRY S. LUCAS, proceed to Washington, D. C., for duty in measures for the control of influenza.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST; SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

ALABAMA

Tribute to Former Surgeon-General Gorgas and Major-General Noble.—In a discussion in the House of Representatives, Oct. 2, 1918, on a bill to provide an additional building for the United States Public Health Service, Representative Bankhead paid the following tribute to Surgeon-General Gorgas:

And, in this connection, Mr. Chairman, it just occurred to me that in a very few weeks, on account of reaching the age limit, the great Surgeon-General of the United States, Gen. William C. Gorgas, will be retired from his present position. I want to say that the people of my native State of Alabama took a great pride in the achievements of that great medical man. His usefulness not only reflects itself in the gratitude of the people of Alabama, but the people of the United States and of foreign countries are under everlasting obligations to that man, whose genius and skill have accomplished so much in the conservation of human life.

As was suggested a few moments ago, he made it possible by the sanitation that he perfected in the Panama Canal Zone to make that great interoceanic canal a reality, and inasmuch as it is largely conceded it was a dream of that great old Alabaman, Senator John T. Morgan, to construct that canal, in just as large measure General Gorgas played a part in the fruition of that enterprise. I feel sure that the Government itself, that the Members of Congress and those who are familiar with his service, will regret the retirement from his present official position of Gen. William C. Gorgas, Surgeon-General.

Following this statement Representative Burnett of Alabama paid the following tribute to General Noble:

In addition to what my colleague from Alabama has said about General Gorgas, I desire to call the attention of the committee to the fact that there is another great Alabaman that stands perhaps second to him in rank and ability in the Surgeon-General's Office, and that is General Noble, of Anniston, Ala., who was with General Gorgas all through his wonderful career in Panama. Alabamans had hoped that when General Gorgas retired, General Noble would be promoted to the position of Surgeon-General. The press carries a report, however, that perhaps another great surgeon, who is now in France, will probably be transferred to this great work on this side, and that General Noble will be assigned to the duties now being performed by that other great surgeon, General Ireland.

I desire to say that those of us who know General Noble believe that there can be no more efficient man assigned to either one of the duties. I know him; I know his family; I know his ancestry, and I believe that to whatever field of operation he may be assigned he will perform the work with the same efficiency that has accompanied every work that he has been assigned to by the Government since he has been in its service.

ARKANSAS

Influenza.—October 8, a statewide quarantine was declared against places where influenza had occurred, and all places of public assemblage were closed. Public travel was not prohibited. According to the report of Dr. J. C. Geiger, representative of the Public Health Service in the state, there had been 1,800 cases of influenza in Little Rock and vicinity, of which 65 per cent. had recovered. Thirty per cent. of the new cases were in children. The pneumonia cases were 1.7 per cent. of the total number of cases and the deaths resulting from complications amounted to 0.2 per cent. An isolation hospital was opened in Little Rock, October 9; the city was divided into districts and a nursing service provided by the Public Health Service.

CALIFORNIA

Health Center.—A health center for the examination of children under 6 years of age was opened at Santa Rosa, October 5. The center will be open daily between 10 and 12 a. m. Dr. Elizabeth M. Yates was in charge on the opening day. All children of less than 6 years will be examined free, and advice will be given as to diet, etc. It is hoped that all babies examined during Better Baby Week will be brought for reexamination so that improvement may be noted, and further advice given if necessary.

ILLINOIS

Physical Defects Removed.—Major John M. Dodson, Chicago, medical aide to Governor Lowden has perfected a plan whereby selective draft men in Class B, which is the remediable group will be able to secure treatment before being inducted into service.

Museum as War Hospital.—It is announced that the new Field Columbian Museum, Grant Park, Chicago, has been offered to the government as a war hospital, and that the offer has been accepted. The building is to be remodeled so as to accommodate 4,300 sick and wounded soldiers, and the construction of a number of buildings for the use of nurses is to be begun at once. The building is on a site 6 acres in extent.

Illegal Practitioners Fined.—G. B. Black, Norris City, White County, was arrested by the Department of Registration and Education of the State of Illinois and fined $450 for practicing medicine without a license. The fine and costs in the case amounted to $725. Black has been practicing medicine in White County for twenty years and has openly defied the authorities to prosecute him. Thomas Deschauer, 702 East Sixty-Third Street, Chicago, was also arrested by the department for practicing medicine without a license and was fined $50 and costs by the court. The department caused the arrest of Mrs. J. McPhee of Joliet, who was found practicing medicine without a license. She was fined $100 and costs.

Tuberculosis at Camp Grant.—The examination of men who have had influenza for possible tuberculous infection is now engaging the attention of Major Clarence L. Wheaton and his corps of assistants who have the matter of camp tuberculosis in their charge. Up to the beginning of the epidemic of influenza, measles had been the special matter of interest to those engaged in the tuberculosis department. Through the efforts of this department tuberculosis in the camp has been kept as low as 1 per cent., and sometimes not a case was on hand. Since the clearing house for examinations of suspects of this sort was established 800 men have been examined. Those suspected of being tuberculous have been placed in the tuberculosis ward of the base hospital for observation and treatment and until final disposition of their cases, which means that they are either returned to their homes or are sent to some government sanatorium for further treatment.

Chicago

Personal.—Dr. H. I. Davis, Chicago, left Wednesday for New York to sail at once for France for service with the American Red Cross.——Dr. James J. McGuinn, Chicago, has been appointed assistant commander of the medical zone in charge of the reconstruction of wounded soldiers in France, by the American Red Cross and has started for his new post of duty.

MARYLAND

Medical Library Closed.—It has been decided that the library of the Medical and Chirurgical Faculty of Maryland will close at 6 p. m. excepting on Fridays. This change is in order to save light and service.

Sanitary Work in Military Zones.—The state department of health has asked the Maryland Council of Defense for an appropriation of $15,000 to continue the sanitary work in military zones in Maryland. Zones have already been established at Fort Howard, Holabird, Edgewood, Aberdeen, Indian Head, and Solomons Island, Curtis Bay, Ordinance Depot, and the Camp Meade area. To supervise these zones ten inspectors will be needed in addition to the number furnished by the board of health. The department has also asked for an appropriation of $6,000 for the control of venereal disease in the state.

Personal.—Lieut.-Col. William H. Welch, Baltimore, attached to the Surgeon-General's staff at Washington, D. C., is recovering from an attack of influenza.——Lieut.-Col. Thomas R. Boggs, Baltimore, has been made chief medical consultant for the air service of the American Expeditionary Forces, attached to general headquarters.——Lieut. Walter L. Denny of Baltimore, who has been ill at Fort Oglethorpe with influenza, is reported improving.——Dr. Benjamin F. Grove, Baltimore, 60 years old, is at St. Joseph's Hospital suffering from contusions of the head and probably a fractured skull as the result of a fall.

MINNESOTA

Regulations Regarding Burial of Influenza Victims.—The state board of health has made an announcement in regard to handling the bodies and burial of victims of influenza. In the case of deaths occurring in the state, public funerals will not be permitted. In the case of bodies of soldiers returned

to Minnesota, public funerals will be permitted on condition that the casket be not opened, and that any escort returning with the body may not attend such funerals or mingle with the public.

Report on Venereal Diseases.—The report of the Division on Venereal Diseases of the Minnesota State Board of Health shows that during the quarter ending September 30 the average monthly expenditure per month was about $2,700 in the administration of the venereal disease regulations. A regulation by the state board prohibiting the sale of venereal disease remedies by pharmacists was endorsed in about fifty replies to a circular letter addressed to them. There have been some violations of the regulation, and a number of druggists will be cited before the state board before prosecution in the courts. An inventory of venereal disease remedies in the stores is being taken. Clinics have been organized, one for women in Minneapolis run by the City Health Department, and a men's clinic at the university for two evenings a week which is being partially financed by the state board. An evening dispensary for men and women was arranged for in St. Paul, and a clinic for both sexes was opened, October 1, in Duluth. During the quarter there were distributed to various departments, dispensaries and institutions, 408 doses of arsenobenzol, 152 Wassermann tests were made and fifty-seven examinations for gonorrhea. Much educational work was done and literature was distributed. A system of reporting cases was inaugurated, August 1, and during that month 620 cases were reported by 137 physicians, of which there were 356 of syphilis, 249 of gonorrhea and fifteen of chancroid. In September, 438 cases were reported, 225 of syphilis, 199 of gonorrhea and fourteen of chancroid. Forty-four physicians were added to the list of those reporting. Through the social service department many sources of infection have been located and the patients placed under treatment. A total of 305 cases have been handled for the quarter. This work is being inaugurated in the towns throughout the state. The quarantine power of the board in venereal cases has been upheld in the district court in Minneapolis.

MISSOURI

Banquet to Society.—Dr. Charles R. Woodson, St. Joseph, was host at the sixth annual dinner of Buchanan County Medical Society, which was held at the Woodson Sanatorium, South Park, St. Joseph.

Tuberculosis Cottage Ready.—The new cottage erected by the health board of St. Joseph, on a site near the City Isolation Hospital, for the treatment of patients with tuberculosis has been completed and is ready for occupancy. The building is a one-story structure, 42 by 16 feet, and is divided into two large rooms for patients, a hallway and living room combined, and a bathroom and diet kitchen. The building will accommodate ten patients.

Personal.—Dr. Ellsworth H. Trowbridge, Kansas City, formerly in charge of medical inspection in the public schools, has been appointed acting assistant surgeon, U. S. P. H. S., and assigned to duty in the Kansas City district.——Dr. Milton P. Overholser, Harrisonville, who has been ill with septicemia in St. Mary's Hospital, Kansas City, is reported to be convalescent.——Dr. William J. Hunt, St. Joseph, has resigned as physician of Buchanan County to enter the military service.

NEW YORK

Infantile Paralysis.—It is reported that there are seventy-seven mild cases of infantile paralysis in the village of Alfred. None of the cases are said to be serious.——Hornell reports fourteen cases of the disease.

First District Branch Elects.—The First District Branch of the Medical Society of the State of New York held its twelfth annual meeting at Tuxedo, October 17, and elected the following officers: president, Dr. Joseph B. Hulett, Middletown; first vice president, Dr. George A. Leitner, Piermont; second vice president, Dr. Edward C. Rushmore, Tuxedo Park; secretary, Dr. Charles Ellery Denison, New York, and treasurer, Dr. John A. Card, Poughkeepsie.

New York Infirmary for Women and Children Appeals for Funds.—This institution is making renewed efforts to secure the $200,000 which is required to enable it to go on with its work. It is sixty-five years since the institution was established, and it has never before been compelled to appeal to the general public for aid. During the last year the infirmary has cared for more than 700 mothers and new-born infants, has performed 643 operations, and has treated 53,000 cases in its clinic.

Personal.—Dr. Bertis R. Wakeman, Hornell, has been appointed city health officer of Hornell, to succeed Dr. John A. Conway, Hornell, who has resigned to accept a commission in the Medical Corps.——Dr. Henry S. Stillwell, Ogdensburg, who has been ill with pneumonia, is reported to be convalescent.——Dr. Abram W. Stoutenberg, Binghamton, has been appointed physician and manager of the Boone County Tuberculosis Hospital, to succeed Dr. William A. Behan, Binghamton, who has resigned to enter the government service.

Loses License.—The board of regents of the University of the State of New York filed in the office of the clerk of Bronx County, October 2, a certificate stating that at the meeting held Sept. 19, 1918, the medical license of Dr. Edgar S. Bullis, Albany, and his registration as a practitioner was annulled. The certificate states that Dr. Bullis "was charged with and found guilty of unlawfully accepting $220, and asking for $2,880 and a diamond ring to influence his decision on a matter pending before him in his place of trust, he being at the time a captain in the United States Army, in violation of the provisions of Section 117 of the Federal Penal Code."

New York City

Clinical Meeting on Deformities.—The clinical meeting of the Hospital for Deformities and Joint Diseases was held, October 22, and Dr. Frederick Tilney discussed, "Gait and Reflexes in Cord Lesions."

Personal.—Dr. Julius Lewis Amster, former health commissioner, is suffering from blood poisoning contracted while operating a few days ago. He is reported to be out of danger.——Dr. William H. Park is seriously ill with influenza.

New Health Zone for Mothers.—A new branch of the Maternity Center Association has been opened at 412 West Forty-Seventh Street, in Health Zone No. 5, which includes that part of Manhattan between Twenty-Sixth and One Hundred and Fifth streets.

School Lunches Approved.—The plan of the board of education to provide luncheons in the public schools of the city has been approved by William Guggenheim, chairman of the Teachers' Loyalty Committee of the American Defense Society. In his letter of approval he states that "The physical health of the children is most essential for their complete mental and moral development. The custom of providing them with luncheons at the schools, therefore, will further very materially so desired an end."

Influenza Situation Serious.—The reports of the New York Health Department show that, October 19, there were 4,930 cases of influenza reported which was about 200 more than on the preceding day. It is believed that about one half the actual number of cases are being reported. While the number of cases of influenza has increased, the number of cases of pneumonia has decreased during the past few days. There has, however, been an increased number of deaths from both diseases. The hospitals of the city are sorely in need of physicians and nurses and are so overcrowded that a number of vacant residences are used for the care of victims of the epidemic. The New York Infirmary for Women and Children has turned over its building to the health department for the care of influenza patients. The Health Commissioner's Emergency Advisory Committee announces the opening of district quarters in different neighborhoods in Manhattan. Forty-two of these centers have been put in operation. This committee issued a statement, October 18, declaring that the epidemic up to that moment was under control and that there is no occasion for public alarm. They have also issued a circular of instructions. Admiral Usher, commandant of the Brooklyn Navy Yards, has issued an order forbidding Navy men to ride on the subway. An investigation by the War Department Industries Board shows that in the factories in Queens where government work is being done and where more than 25,000 persons are employed, approximately 12 per cent. of the employees were absent from work and in some of the plants the absentees ran as high as 35 per cent.

OHIO

Personal.—Dr. A. Irving Ludlow, Seoul, Chosen, Korea, formerly of the surgical staff of the Lakeside Hospital, Cleveland, has gone to Harbin, Manchuria, as a member of the American Red Cross Unit to form a hospital base for the Japanese, Czecho-Slovac forces operating along the line of the Trans-Siberian Railway.——Lieut. Daniel H. Bowman, M. C., U. S. Army, Kenton, is reported to be seriously ill at Camp Greenleaf, Ga.

District Tuberculosis Hospitals.—District tuberculosis hospitals now provide for tuberculous persons from twenty-seven counties of the state, and twenty-two other counties have taken steps to establish districts, and following that, hospitals. Preliminary steps have been taken recently by Fairfield, Licking, Coshocton, Muskingum and Perry counties to establish a hospital, making the third new district formed this year. The importance of establishing the hospitals is emphasized by the fact that already nearly 750 discharged tuberculous soldiers from Ohio have been reported to the state department of health, and of this number only twenty-seven have been admitted to sanatoriums. The number of cases among soldiers will no doubt increase as the war goes on.

PENNSYLVANIA

Tax Opposed by Physicians.—The physicians in attendance at the meeting of the Medical Society of the State of Pennsylvania are said to have gone on record as unanimously opposing a bill before Congress classing medicine as a luxury and subjecting it to a tax of 10 per cent.

Personal.—Dr. Thomas S. Blair, Harrisburg, has been appointed chief of the new Division of Control of Narcotics in the state department of health.——Dr. Aaron D. Weaver, Old Zionsville, who has been ill with influenza, is reported to be convalescent.——Dr. Conrad J. Becker, Wilkes-Barre, was run down and seriously injured by an automobile, October 1.

Ruling on License Revocation.—The attorney-general's department of the state has notified Dr. John M. Baldy, Philadelphia, chairman of the State Bureau of Medical Education and Licensure, that the bureau "has no power to revoke the license of a physician whose right to practice was obtained prior to the Act of June 3, 1911, if the offense was prior to the Act of May 24, 1912."

Influenza.—Eight Army surgeons have been sent into Dauphin County to help fight the epidemic, replacing physicians smitten with the disease, and four senior medical students have been sent to Williamstown. Members of the reserve militia are acting as orderlies in emergency hospitals at Bristol, Paoli, Nanticoke and Homestead. October 15, the Red Cross ran a truckload of drugs from Philadelphia to Pottsville. October 17, Dr. B. Franklin Royer, Harrisburg, acting commissioner of health, refused to rescind his action (closing the wholesale and retail liquor houses) or to give any date when the ban would be lifted. Richard Wood of Allan Wood Iron Company, Conshohocken, gave $5,000 for the maintenance of an emergency hospital in that town for the care of the needy influenza patients.

Philadelphia

New Dean.—Dr. Allan J. Smith has been appointed dean of the Medical Department of the University of Pennsylvania to fill the post of Dr. William Pepper.

Influenza Mortality High.—While the number of new cases of influenza has somewhat decreased, the death rate for the week ending at noon, October 19, was much higher than the previous week. The number of new cases for the week was 14,566 as compared with 20,854 for the week preceding. The death rate, however, was 4,596 as compared with 2,635. The death rate for the week from all causes reached 5,270, representing a mortality rate of 156.01 per thousand, as compared with 95.74 the week ending October 12, when Philadelphia showed the highest death rate that had ever been recorded. The total number of deaths for the three weeks during the height of the epidemic reached 10,301, of these influenza and pneumonia cases 8,578. A number of emergency hospitals have been opened. The entire main building of the Woman's Hospital at Twenty-Second Street and North College Avenue, both surgical and medical, has been turned over to caring for emergency influenza cases and all the available space has been occupied by patients. Thirty nurses have been stricken with the epidemic and two have died, but the work of caring for the suffering has not been hampered as a number of women have volunteered as nurses. One is serving as an ambulance driver in place of the regular driver who is ill. Red Cross group No. 9 has opened an emergency hospital in St. Stephen's parish house, Wissahickon. Supplies have been sent to the building from the Red Cross headquarters but the upkeep of the hospital will depend on the support of the residents of the twenty-first ward. The members of the North Philadelphia Business Men's Association rented a building at 4015 Germantown Avenue and have 100 beds. Dr. Edward H. Wiggins is the physician in charge; in South Philadelphia, where the conditions were most distressing, the South Philadelphia Republican Club at Broad Street and Snyder Avenue, was transformed into an emergency hospital capable of caring for seventy-five patients; $4,000 was contributed by the South Philadelphia business men and the patients were taken care of by a few doctors assisted by twenty fourth-year medical students. An old horse-driven ambulance was resurrected and a fireman volunteered as driver and many of the poor not only received medical attention but were supplied with food. Problems of all sorts have resulted from the epidemic: the task of feeding many families of influenza patients; of fumigating the houses where patients have died and caring for the hundreds of children left helpless by death of parents. The Division of Child Hygiene in the bureau of health is grappling with the problem of the orphaned children; the College Settlement has organized numerous squads for inspecting, cleaning and disinfecting houses, and twelve emergency food service centers have been established. The city opened an emergency hospital in the old Medico-Chirurgical Hospital and a number of physicians volunteered their services.

CANAL ZONE

Report of Health Officer on Venereal Diseases.—In his report for the quarter, April, May and June, 1918, Arthur T. McCormack, chief health officer of the Canal Zone, discusses the situation with reference to venereal diseases in the zone and offers some plans for the improvement of conditions, which he says is the greatest problem that has been presented. The matter has been the subject of conference between the health and the military authorities. Panama and Colon are within the exclusive jurisdiction of the sanitary authorities of the United States and the police jurisdiction of the Republic of Panama. Neglect of the Panama authorities to enforce any sort of regulation resulted in a great increase in venereal diseases among our soldiers and forced the commanding general of the department to issue a general order which was, in effect, a quarantine against the two cities named with reference to venereal diseases, habit forming drugs and alcohol, and to protest against the graft and incompetence which always accompany these evils. The uncertain effect of land quarantines and the undesirability of an indefinite quarantine along a boundary line between two friendly states finally resulted in the acceptance by the Panama authorities of a plan proposed by the chief health officer by which the former retained their police authority and the latter the sanitary responsibility. Prostitution is forbidden in the zone itself, prostitutes are deported, and employees contracting venereal diseases are heavily penalized, yet the chief health officer says these diseases have alternated with tuberculosis as the most common cause of hospital admission since malaria has been under control. In Panama and Colon segregated districts have existed almost since the American occupation, but there are more prostitutes outside of these districts than in them, and it is said about 90 per cent. of the patrons of the prostitutes are American soldiers, sailors and civilians. General Order No. 20, the order referred to, greatly reduced the evil, but, July 15, a decree was to become effective that every woman remaining in the segregated district, as well as the clandestines, must be examined and all those infected treated in the Santo Tomaso Hospital at the expense of the Republic of Panama. Every man applying for admission to the segregated district was to be examined by a physician, and if diseased, required to submit to treatment in or out of the hospital, at the discretion of the health officer. Ten per cent. of the men so far examined, it is said, have been found infected and treated, the indigent at the public expense. About one-third of those examined in the laboratories were found to be syphilitic, and this is said to indicate about the ratio of those infected in the population of the two cities. Under the decree house owners renting to prostitutes are fined by the health officer, and thus placing the burden of enforcement on them forces the clandestines to come to the segregated district where they are examined and treated by qualified physicians only. Druggists are forbidden to have in their possession patent medicines or other remedies for venereal diseases except such as are prescribed by physicians. Physicians are required to report all cases treated by them. The health officer suggests three plans for handling the matter: The abrogation of this decree and the issuance of a police decree enforceable in the Panama courts making all vice criminal. On account of the acceptance of illicit intercourse as a necessary evil by the Panamaians, such a decree would be even more negligible as a factor in disease prevention than it is in the United States. A second plan would be to increase the personnel of

the health department by twelve physicians, four of whom should be gynecologists, and three inspectors, together with an appropriation of about $2,000 per month to Santo Tomaso Hospital to increase the force of nurses and orderlies. This, it is said, would cost between $50,000 and $75,000 a year, but would rapidly decrease venereal diseases. The third plan, and the one which the health officer at present thinks would be least satisfactory, would be to allow the old conditions to return, only increasing the personnel of the health departments of the two cities, and depending on the education of the public to hasten the elimination of these diseases. This it is said would take many years, whereas only months would be required by a more radical plan, such as the second plan outlined. The health officer fears, however, that the third plan will have to be adopted unless the money is forthcoming speedily to carry out the more radical plan.

CANADA

Hospital Opened.—The formal opening exercises of the Laval Hospital of Quebec were held at St. Foy, October 13.

Hospital News.—Fifteen municipalities throughout Alberta are taking advantage of the rural hospital legislation, and the largest hospital yet arranged for is to be at Wainwright. Vermillion, Mannville and Lacombe are also getting their organizations under way.——Soldiers discharged on account of tuberculosis are to have increased provision for their care in the western provinces, and a new sanatorium is to be erected at Bowness. Accommodation is to be arranged for from 300 to 400 patients.——Winnipeg is to erect a smallpox hospital on the grounds of the King Edward and King George hospitals.

Society Meetings.—At the annual meeting of the College of Physicians and Surgeons of the Province of Quebec, held recently in Quebec, the following officers were elected: president, Dr. Rudolphe Boulet, Montreal; vice presidents, Drs. Albert Laurendeau, St. Gabriel de Brandon; Louis Ph. Normand, Trois-Rivieres, and Arthur A. Simard, Quebec, and secretary, Dr. Joseph Gauvreau, Montreal.——At the annual meeting of the Manitoba Medical Association held in Winnipeg, recently, the following officers were elected: honorary president, Dr. Francis-X. Demers, Ste. Anne des Chenes; president, Dr. Louis S. Gendreau, St. Norbert; vice president, Dr. Fortunat LaChance, Winnipeg, and secretary-treasurer, Dr. J. Prendergast, St. Boniface.

Personal.—Major Frederick A. Cleland, Toronto, has left for the Pacific Coast where the Canadian-Siberian Force is mobilizing. He is to be medical officer to the contingent.——Capt. A. S. Hayche, R. A. M. C., has been wounded three times, and has been awarded the Military Cross.——Capt. Frank Muir Walker, M. B., R. A. M. C., received the Military Cross when Prince Arthur of Connaught recently visited Toronto.——The following officers are reported wounded: Lieut.-Col. David Donald, Victoria, B. C., C. A. M. C.; Major George S. Mothersill, D.S.O., Winnipeg, Man., C. A. M. C.; Capt. J. C. Eager, C. A. M. C., Watertown, Ont.; W J. Sobey, C. A. M. C., les Gatlos, Ont.; D. S. Campbell, C. A. M. C., Woodside, N. S.; A. E. McCusker, C. A. M. C., Regina, Sask.; F. B. Lobb, C. A. M C., St. John, N. B.——Capt. Edgar Douglas, Vancouver, B. C., has been awarded the Military Cross.——Dr. Arthur A. Simard, Quebec, has been appointed president of the Superior Council of Hygiene, to succeed the late Prof. E. P. Lachapelle.

GENERAL

Society Meeting Postponed.—The ninth annual meeting of the American Association for Study and Prevention of Infant Mortality which was to have been held at Asheville, N. C., November 11 to 14, has been postponed until further notice on account of the epidemic of influenza.

Bequests and Donations.—The following bequests and donations have recently been announced:

Lebanon, Pa., Hospital, $2,000, Eaglesville Sanatorium for Consumptives, and Jewish Hospital, Philadelphia, each $500, by the will of Solomon Asher.

College of Physicians and Surgeons, in the City of New York, $9,000 to be applied toward work in tuberculosis, from the trustees of the East River Homes Foundation; $5,000 from an anonymous donor to be used in surgical research; $1,000 each, to the funds to provide for the admission of women to the medical school, William H. Moore, Arthur Curtiss James, Elizabeth Waterbury, Forrest S. Bryden, J. M. Wallace, D. G. Reid, and F. L. Hines.

Chicago Winfield Tuberculosis Sanatorium, and Chicago Lying-In Hospital and Dispensary each $2,000, by the will of Ferdinand Silverman, Chicago.

Children's Free Hospital, Louisville, $1,500; St. Joseph Infirmary, $500, by the will of Dr. James Morrison Ray, Louisville.

Welfare Committee for Tuberculosis.—At the closing of the annual convention of the Northwest Tuberculosis Conference in Seattle, a committee was appointed to care for the welfare of victims of tuberculosis who move from state to state. This committee consists of Drs. Bolivar J. Lloyd, Seattle; Albert E. Stuht, Spokane; Mrs. Bethesda Beals Buchanan, Seattle; Major Ralph C. Matson, Camp Lewis, Portland, Ore.; Mrs. Katherine Athey, Boise, Idaho; Judge J. F. Ailshie, Boise; Frank Leclere, Salt Lake City; Mrs. R. A. Morton, Cheyenne, Wyo., and Mrs. John Fulton, Reno, Nev.

Influenza.—For the week ending October 12, according to the report of the United States Census Bureau, statements received from forty-six cities showed that there were 6,122 deaths from influenza and pneumonia. Philadelphia led with 1,697; New York had 979; Boston, 850; Chicago, 571, and Washington, 387. Only forty deaths were reported from St. Louis and thirty-seven from Minneapolis. Of pneumonia cases there were 1,642 in New York, 938 in Philadelphia, 476 in Chicago, and 101 in Washington. The total number of cases since September 13 was, on October 12, 262,186. A report from Washington, October 15, showed improvement in the influenza situation in the army camps and the peak of the epidemic, it was hoped, had been passed. This is probably also true with reference to the civilian population of the cities of the eastern part of the country. The disease is now prevalent in every state in the Union. In Washington, D. C., the War Department and other departments have directed that no new employees be brought to the city during the epidemic. Congress has passed a bill establishing a reserve corps in the Public Health Service. If this is signed by the President, it is expected to assist in promoting the work of the Service in handling the influenza epidemic. Charge is being taken by the Public Health Service of the situation in all the large centers. A million dollars has been voted by Congress to the service to aid in carrying out measures against the disease. In Philadelphia the director of Health and Charities, Dr. Wilmer Krusen, has suggested the zoning system in employing physicians to treat influenza. This means that each patient will call a physician nearest to him in his district. October 13, the Louisiana State Board of Health estimated that there were 250,000 cases in the state. New cases reported on that date were 594. In Virginia it was estimated, October 16, that there were 200,000 cases in the state; in Connecticut, 110,000; in California 6,500 cases had been reported to October 14. October 16, new cases among the troops in camp numbered 5,680, against 6,498 the day before. Pneumonia cases were 1,895 as compared with 1,916 for the previous day. The deaths were 710, a decrease of 179. Improvement in the situation was noted in Vermont and New Jersey and in parts of Tennessee. At Davenport, Iowa, the Manufacturers' Association met with the Red Cross and arranged to equip an emergency hospital with from twenty-five to fifty beds with graduate and volunteer nurses in attendance. Ohio reported October 21, that there had been 100,000 cases in the state to that date. The state authorities were cooperating with the Public Health Service and volunteer physicians and nurses are being provided where needed. A quarter of a million circulars and leaflets on influenza have been distributed. Improvement is reported from some cities where the situation had been serious. October 22, based on reports for the previous forty-eight hours, in Chicago it was thought that the epidemic had decreased to the extent of 30 or 40 per cent. and that the peak of the epidemic had been passed, but efforts were not relaxed and everything was kept closed. For the period of forty-eight hours there were 2,700 new cases, 680 of which were of pneumonia.

FOREIGN

Italian Military Hospital at Grenoble.—The *Policlinico* states that the most important sanitary formation for the Italian troops in France has just been equipped by private gifts with a radiologic cabinet.

In Honor of Golgi.—As Prof. C. Golgi of the chair of general pathology at the University of Pavia is retiring this year on account of having reached the age limit, a committee has been formed to do him honor. It has been decided that the testimonial should take the form of a scholarship in the medical department of the University of Pavia, to be awarded preferably to the orphans of physicians, and in particular to victims of the present war. The committee includes representatives of the medical department, and the

local and provincial medical organizations. Subscriptions are received by the treasurer of the Ordine dei medici della provincia di Pavia.

SOUTH AND CENTRAL AMERICA, MEXICO AND WEST INDIES

Deaths on a Liner.—October 7, the Spanish liner, *Alfonso XII*, arrived at a Cuban port reporting twenty-four deaths during the voyage from a malady not diagnosed, but which it is thought must be influenza. It is said that two persons among the 1,200 passengers, crazed by suffering, committed suicide. Sixty persons were ill on the arrival of the ship, forty of whom were in a serious condition.

Personal.—Dr. F. M. Fernandez, editor of the *Cronica Medico-Quirurgica* of Havana, was recently awarded the Cañongo prize by the Academia de Ciencias Medicas, Fisicas y Naturales for his work on the etiology and treatment of strabismus.——Dr. B. Saenz has been appointed to the chair of dermatology at the University of Havana after competitive examination, and Dr. M. Dominguez has been appointed chief of the National Laboratory.

MEXICO LETTER

Mexico City, Oct. 9, 1918.

Free Dispensary for Venereal Diseases

The Sociedad de Profilaxia de las Enfermedades Venereas has opened in Tacuba St., No. 78, a free evening dispensary to care for the poor with venereal disease. The work is to be done by several of the medical members of the society. Besides treating the gonorrheal and syphilitic, they will instruct in the indispensable ideas of sexual hygiene and in the evil consequences of trusting treatment to charlatans and of attempts at self treatment with the so-called specifics. A group of philanthropic persons contributed the funds to organize this dispensary, a total of 1,000 pesos, and others have offered to pay a monthly quota for its support. The society intends to give the treatments entirely free of charge with the possible exception of injections of arsphenamin and neoarsphenamin—especially the first mentioned—the price of which at present is almost prohibitive.

New Laboratory

When the public health service was reorganized last year into the Departmento de Salubridad Publica, the bacteriologic laboratory, which was one of the features of the old Consejo de Salubridad, was suppressed. This laboratory was due to the initiative of Dr. E. Liceaga, at that time president of the Consejo de Salubridad and it aided in the diagnosis of typhoid fever, malaria, diphtheria and tuberculosis, besides its other work, all free of charge to the public. As the effects of the lack of such an institution are being felt, it is now proposed to reopen it, and henceforth the laboratory will make pathologic, bacteriologic and chemical analyses as before and in addition the Wassermann fixation test. The directors of the laboratory are to be Drs. Amerena and Garduño Soto.

"Allied Notes"

As at present there are no papers published in English in Mexico City, the *Universal*, the daily with the largest circulation in Mexico, which has always been friendly to the Allies, has commenced to publish a section entitled "Allied Notes" or "Comments," in which items of interest for the members of the North American and British colonies here are published in English, and the philanthropic and welfare work which they are doing is recorded. Lately the ladies of these colonies have been making clothing for Belgian and French orphans whose fathers have sacrificed their lives on the altars of progress and human civilization.

The French colonies are not mentioned in these "Notes," as they already have a daily and biweekly, published in French. Until 1915, the *Mexican Herald* was published here by Señor P. Hudson.

Typhus in Uruapan

It has been reported that the city of Uruapan, in the state just west of the capital, is being scourged with *tabardillo*. The federal sanitary authorities have taken the necessary steps to stamp out the disease.

Antirabies Institutes

The public health authorities are contemplating the establishment of several antirabies institutes throughout the country as the one in the capital is unable to care for all who require treatment, especially in remote districts not connected by railroad with the capital. In such cases it is extremely difficult for persons who have been bitten by a rabid animal to get treatment in time, especially the indigent. During August, ninety-one persons were given treatment at the institute here. Since then the brains from several rabid animals have been sent to Toluca to initiate the inoculation treatment in that neighboring city.

Medical Service in the Emergency Stations

Measures have recently been taken to improve the medical and surgical service in the Comisarias de Policia where the victims of accidents or crimes are tended and registered, and to which the indigent apply who are seeking admission to the public hospitals. Until now these services have been inadequate for the needs of the populace.

Delegates to Child Welfare Congress

The second Congreso Americano del Niño is to be held at Montevideo in December, and Señor A. Nervo, diplomatist and author, and the Mexican consul at Montevideo have been appointed to represent the Republic of Mexico at that meeting. They are to present the articles prepared by Mexican physicians. It was previously rumored that Dr. E. Aragon, the professor of legal medicine here, was to have been the official delegate.

Influenza

News has been received that influenza is prevailing in epidemic form in the states of Coahuila, Nuevo Leon and Tamaulipas, bordering on Texas, and it is feared that railroad communication between Mexico and the United States may be impeded by the sanitary police measures that may have to be taken to isolate the epidemic focus.

New Professor of Chemistry

The pharmacist, M. de M. y Campos has been appointed to the chair of chemistry in the pharmacy department of the University here after competitive examination of three candidates.

Academy of Medicine

The Academia Nacional de Medicina resumed its sessions October 2, after the regular vacation. Dr. R. E. Cicero, of the dermatology section, now presides at the meetings, and Dr. D. Lopez is the secretary. Dr. E. Montaño, of the ophthalmology section, was elected vice president and Dr. M. E. Soberon second secretary.

LONDON LETTER

London, Sept. 17, 1918.

The Shortage of Medicinal Oils and Fats

A committee appointed by the Home Office on the outbreak of war to deal with economy in the use of drugs has issued a memorandum to the medical profession on measures necessary to meet shortage or discontinuance of the supply of lard, olive oil and castor oil for medicinal purposes. The prior claims, partly of food supply and partly of munition production, have for some months compelled restriction or even discontinuance of these substances for medicinal purposes. At present lard can no longer be released for medicinal use. The amount of olive oil and of the possible substitutes, sesame and arachis oils, that can be released is uncertain. Little if any of the quality of castor oil hitherto required for conformity with the pharmacopeial standard can be used. To obviate the difficulties that might have arisen through the fact that these substances are ingredients of many official preparations, the General Medical Council, after consultation with the Home Office Committee, directed, in an alteration and amendment of the British Pharmacopeia, 1914, that certain preparations be withdrawn from the British Pharmacopeia until further notice, while in the case of other preparations containing oils and fats, the use of various substitutes was sanctioned. By these alterations, considerable latitude was accorded in the dispensing of prescriptions that contained the official preparations affected. It appeared desirable, therefore, that some understanding should be established between prescribers and dispensers that should obviate uncertainty, and it seemed that this would best be effected by the suggestion of alternative preparations of definite formulas. The Pharmaceutical Society, acting in cooperation with a body of representative manufacturers and the Home Office Committee, undertook the necessary experiments, and has now constructed a set of war emergency formulas. The following suggestions are offered for the assistance of physicians in prescribing:

Lard can no longer be dispensed either as such or as an ingredient of a prescription. A base consisting of 5 per cent. wool fat, 10 per cent. hard paraffin [paraffin] and 85 per cent. soft paraffin [petrolatum] is on the market, and will, it is believed, afford a suitable substitute for most cases in which lard would previously have been ordered. For some cases the physician may find it advisable to modify the proportions of the ingredients named. Ointments formerly containing lard or lard and suet are now allowed to be prepared with wool fat or paraffin or mixtures of these in place of the lard or lard and suet, which may no longer be used. The base described above (named for convenience adeps factitius) has been found to afford a satisfactory substitute in the preparation of these ointments, and war emergency formulas containing it have been constructed.

For olive oil, sesame oil or arachis oil may be substituted, but none of these vegetable oils should be ordered avoidably. When required for external purposes a specially prepared mineral oil derived from petroleum (known as paraffinum liquidum flavum) is now obtainable, and will in most cases be found to afford a satisfactory substitute.

Four liniments containing olive oil have ceased to be official. War emergency formulas, containing the specially prepared mineral oil mentioned above, have been devised Liniments so prepared are on the market and may be substituted for the former official preparations.

For castor oil it has been found that the neutralized seconds castor oil, now recognized by the pharmacopeia and readily obtainable, affords a satisfactory substitute for the first quality oil hitherto used. One preparation containing castor oil has been withdrawn, namely, liquor cresol saponatus. For the preparations containing castor oil remaining official, collodium flexile, linimentum sinapis, and liquor epispasticus, the neutralized second oil will be used.

The Sinking of the Llandovery Castle

The results of an inquiry by the Minister of Overseas Military Forces in Canada Sir Edward Kemp, into the sinking of the hospital ship *Llandovery Castle*, June 27, are published in the August number of the *Bulletin* of the Canadian Army Medical Corps. Two facts stand out—the devotion and sacrifice of the medical personnel and the ship's company, and the dastardliness of the outrage. "Deliberate in its conception, every circumstance reveals the German in the light of the cunning murderer who employs every foul means of destroying all traces of his crime. No other explanation can be attached to the systematic attempts of the submarine to ram, shell and sink the lifeboats and wreckage floating helplessly with their 258 victims 116 miles from land—a work of destruction so successfully performed that only one boat containing twenty-four survivors escaped." The ship had been in service for the Canadian government as a hospital ship since March, 1918, and made four voyages to Halifax. She was on her return voyage carrying the crew and hospital establishment, but no patients nor any passengers. The statement of the submarine commander that she carried American flying officers or munitions is simply the usual convenient fiction of the Hun. There were no grounds whatever for mistaking her for anything else than a hospital ship. Except one medical officer, a sergeant and four privates, all the medical personnel were lost, including the commanding officer, Lieutenant-Colonel Macdonald of Nova Scotia.

PARIS LETTER

PARIS, Sept. 19, 1918.

Health Conditions in France

The Conseil supérieur d'hygiène, at its last session, considered reports furnished by the director of the Assistance et Hygiène publiques au ministère de l'intérieur, and the representatives of the office of the Service de Santé militaire and of the Service de Santé de la marine on health conditions in France. The *Conseil* verified the statements that while there are many small foci of grip in various parts of the country, as is also the case in Algiers, in the colonies, and in most foreign countries, and although, owing to the severe heat, dysentery has made its appearance anew in French territory, yet there has not been a single case of typhus, plague or cholera.

Heated Air in the Treatment of War Wounds

Drs. Belot and Dechambre reported to the Société médico-chirurgical de la XIII-e Région the good results which they have obtained from the treatment of war wounds with a jet of hot air. The temperature of the air varied between 60 and 80 C., with a pressure of 4 or 5 kilograms. It is well to combine this treatment with massage of the surrounding and subjacent tissues. The heated air dries the wound, the odor disappears, and dead tissue is thrown off. The surface becomes rosy in hue, small granulations form, and epidermization takes place, extending from the periphery toward the center. The duration of the treatment varies from one to three months. About 600 cases which have resisted the usual methods of treatment have been treated by Belot and Dechambre in the manner described, with only 5 or 6 per cent. of failures, generally restricted to cases associated with severe trophic lesions.

Treatment of Ulcers

Several surgeons have had good results from the treatment of wounds with balsam of Peru, which is a good deodorizer, antiseptic and keratoplastic. Dr. Morlet uses the balsam especially in the treatment of ulcers. In order to lessen the discharge of pus from the wound and to prevent its stagnation in the wound, he mixes bismuth subnitrate with the balsam, making an absorbent paste of the mixture when it has dried. In this manner a sort of embalming dressing is obtained, which is semi-occlusive and yet at the same time permits the pus to escape from the wound, and then acts as a drier. The mixture contains 15 to 20 gm. of balsam of Peru; the same amount of bismuth subnitrate; 50 gm. of *colle de poisson* (gelatin); 50 gm. of glycerin and 100 gm. of water. The *colle de poisson* should be used in preference to any other gelatin, which may be infected with tetanus bacillus spores. The wound is cleaned with alcohol and the paste is applied by means of strips of tarletan which have been impregnated with the heated paste. They are then placed over the wound in the same manner as is a silicate bandage. This dressing is left in place for from twelve to fifteen days. According to the size of the wound, one or two dressings only are necessary, rarely a third. The patient is permitted to be up and about, thus adding mechanical action from walking to the keratoplastic and drying qualities of the paste.

Emetin and Ipecac

Since subcutaneous injections of emetin hydrochlorid have established a place for this agent in the treatment of amebic dysentery, other indications for its use have been found, notably in the treatment of hemoptysis, pulmonary congestion, etc. In this connection attention should be directed to the danger attending the use of ipecac even in infinitesimal doses, in cases in which emetin has been previously used. Drs. G. Billard and Blatin have made some interesting observations in this respect. In twelve cases of amebic dysentery of severe type, in which the emetin seemed to have exhausted its efficiency, it was thought advisable to resort to the use of ipecac, administered according to the Brazilian method. In order to determine the susceptibility of the patient to ipecac, 0.05 gm. of powdered ipecac was administered. In each instance, in a few minutes, the patient became pale, nauseated and then vomited; in four cases cardiovascular symptoms appeared, with syncope of short duration; in one instance these symptoms became alarming, an actual narcoleptic state ensuing and lasting for more than eight hours.

Marriages

LIEUT. CLAUDE EVERETT BROWN, Assistant Surgeon, U. S. Navy, Sacramento, Calif., on duty at the U. S. Naval Transport Depot, New York City, to DR. ALICE CORNELIA SCULLY of Springfield, Mass., September 26.

LIEUT. ROBERT PERCIVAL PARSONS, Assistant Surgeon, U. S. Navy, Chicago, on duty at Deer Island, Boston, to Miss Marion L. Murray of Allston, Boston, recently.

LIEUT. LEO L. SMITH, M. C., U. S. Army, Sapulpa, Okla., on duty at Camp Pike, Ark., to Miss Mabel E. Robison, at Sapulpa, August 22.

LIEUT. JAMES LEONARD REYCRAFT, Assistant Surgeon, U. S. Navy, Cleveland, to Miss Marie Dannemiller, also of Cleveland, October 2.

LIEUT. STANLEY JOSEPH SEEGER, M. C., U. S. Army, Milwaukee, to Miss Helen Brachman of Texarkana, Texas, October 8.

JOHN ARTHUR FOLEY, Dorchester, Boston, to Miss Elizabeth Ewing of Roxbury, Boston, recently.

Deaths

Frank Fairchild Wesbrook, Vancouver, B. C.; Manitoba Medical College, Winnipeg, 1890; aged 50; a Fellow of the American Medical Association; president of the University of British Columbia, Vancouver, since 1913; died at his home, October 21. He was formerly professor of pathology and bacteriology in the University of Manitoba; professor of pathology and bacteriology in the Medical School of the University of Minnesota from 1895 to 1913, and dean of the institution from 1906 to 1913; director of laboratories of the Minnesota State Board of Health from 1896 to 1911, and member of the board from 1896 to 1900, and from 1911 to 1912; a member of the advisory board of Hygienic Laboratory, U. S. P. H. S., from 1904 to 1913; president of the American Public Health Association in 1905; president of the section on state and municipal hygiene of the International Congress of Hygiene and Demography in 1912; chairman of the provincial committee on food resources, and a member of many learned societies of the United States, Canada and Europe.

Frank Baker, Washington, D. C.; George Washington University, Washington, D. C., 1880; aged 77; a Fellow of the American Medical Association; professor of anatomy of Georgetown University since 1883; for many years lecturer on artistic anatomy at the Corcoran Art Gallery; superintendent of the National Zoological Park from 1886 to 1916; president of the Association of American Anatomists in 1897; and once vice president of the American Association for the Advancement of Science; assistant superintendent of the U. S. Life Saving Service from 1889 to 1890; editor of the *American Anthropologist* from 1891 to 1898; died at his home, about September 30.

Frederick Carroll Heath, Indianapolis; Bowdoin Medical School, Brunswick and Portland, Me., 1884; aged 61; at one time a Fellow of the American Medical Association; secretary of the Indiana State Medical Society from 1896 to 1910, and president in 1910, and president of the Indianapolis Medical Society in 1905; eye surgeon to the Indianapolis City Hospital and Dispensary, the German Lutheran Orphan Asylum and Eleanor Hospital; professor of ophthalmology in the Indiana University Medical College since 1905; at one time assistant surgeon in the U. S. P. H. and M. H. S.; died at his home, October 16.

Lieut. Herbert Douglas Taylor, M. C., U. S. Army, New York City; Johns Hopkins University, Baltimore, 1914; aged 29; a Fellow of the American Medical Association; for three and one-half years a member of the scientific staff of the Rockefeller Institute; an instructor in parasitology in the officers' school at that place, and in charge of the laboratory of the War Demonstration Hospital; also instructor to the surgical staff in bacteriology of wounds; an investigator of great talent and promise; died in the Rockefeller Hospital, New York, October 7, from pneumonia, following influenza.

Clarence Hamilton Gray, Philadelphia; University of Pennsylvania, Philadelphia, 1905; Hahnemann Medical College, Philadelphia, 1915; aged 35; at one time a Fellow of the American Medical Association; a member of the Medical Society of the State of Pennsylvania; chief of the staff of the Maternity Hospital and a member of the ophthalmological staff of the Hahnemann Hospital, Philadelphia; died at his home, October 6.

Herbert Marion Stowe, Chicago; Rush Medical College, 1896; aged 44; a Fellow of the American Medical Association; assistant professor of obstetrics in Northwestern University Medical School; assistant obstetrician to Provident Hospital; attending obstetrician to the Chicago Lying-In Hospital, and a member of the staffs of Cook County and Mercy hospitals; died, October 21, from appendicitis.

Asst. Surg. Bronson Ewing Summers, Lieutenant (Junior Grade), U. S. Navy, Richmond, Va.; Medical College of Virginia, Richmond, 1912; aged 28; a Fellow of the American Medical Association; at one time assistant health officer of Richmond; on duty with the United States Marine Corps at Quantico, Va.; died in the hospital of that camp, October 12, from pneumonia, following influenza.

Lieut. Nial Franklin Twigg, M. C., U. S. Army, Brockton, Mass.; Johns Hopkins University, Baltimore, 1917; aged 25; who had been connected with a base hospital at Birmingham, England, was returned to the United States about six months ago, and was assigned to duty at Fort Oglethorpe, Ga.; died in General Hospital No. 14, Fort Oglethorpe, October 10, from pneumonia, following influenza.

Lieut. Emil King, M. C., U. S. Army, Fulda, Minn.; University of Pennsylvania, Philadelphia, 1893; aged 51; a Fellow of the American Medical Association and a specialist on diseases of the ear, nose and throat; on duty with the American Expeditionary Forces in France, is reported to have been killed in action, about October 7.

Lieut. Irving Jonas Pinkus, M. C., U. S. Army, New York City; University and Bellevue Hospital Medical College, 1914; aged 27; a Fellow of the American Medical Association; is reported to have been killed in action, August 31.

John Wesley Kinard, Lancaster, Pa.; University of Maryland, Baltimore, 1882; Bellevue Hospital Medical College, 1889; aged 60; a Fellow of the American Medical Association,

Died in the Service
ASST. SURG. HADLEY H. TETER,
LIEUTENANT, U. S. NAVY,
1891-1918
(*See The Journal last week, p. 1334*)

Died in the Service
IN FRANCE
LIEUT. IRVING J. PINKUS, M. C.,
U. S. ARMY, 1891-1918

Died in the Service
IN FRANCE
LIEUT. EMIL KING, M. C.,
U. S. ARMY, 1867-1918

and once president of the Lancaster City and County Medical Society, and Lancaster Pathological Society; local physician of the Pennsylvania Railroad; died at his home, October 8, from pneumonia.

Major Clarence Fahnestock, M. C., U. S. Army, New York City; College of Physicians and Surgeons in the City of New York, 1900; aged 45; a Fellow of the American Medical Association; chief surgeon of the Three Hundred and First Infantry, at Camp Devens, Ayer, Mass., and later on duty as a line and medical officer in France; died, October 5, from pneumonia.

Capt. Warren Walker, M. C., U. S. Army, Philadelphia; University of Pennsylvania, Philadelphia, 1900; aged 39; a Fellow of the American Medical Association; surgeon to the outpatient departments of the Episcopal and Children's hospitals; was burned to death in the fire which consumed the officers' quarters at U. S. Base Hospital No. 3, Colonia, N. J., October 9.

Adolph Cohn, Philadelphia; Medico-Chirurgical College of Philadelphia, 1913; aged 26; at one time a Fellow of the American Medical Association; a member of the Medical Society of the State of Pennsylvania; surgeon to the Baldwin Locomotive Works, and draft board examiner; died at the Jefferson Hospital, October 7, from pneumonia, following influenza.

Paul Guilford, Chicago and LaGrange, Ill.; University of Pennsylvania, Philadelphia, 1891; aged 48; a Fellow of the American Medical Association; attending oculist and aurist to St. Luke's Hospital, Chicago; a well known specialist on diseases of the eye, ear, nose and throat; died at his home in LaGrange, October 20, from pneumonia, following influenza.

Lieut. Clayton A. Endicott, M. R. C., U. S. Army, Frankfort, Ind.; State College of Physicians and Surgeons, Indianapolis, 1907; aged 37; a Fellow of the American Medical Association, and secretary of the Clinton County Medical Society; secretary of the Frankfort Board of Health; died at his home, October 8, from pneumonia, following influenza.

James Christopher Wallis, Arkadelphia, Ark.; Jefferson Medical College, 1877; aged 64; a Fellow of the American Medical Association; president of the State Medical Board of the Arkansas Medical Society, and of the Arkansas Medical Society in 1915; and once president of the Clark County Medical Society; died at his home, October 10.

Lieut. Carl Calvin Culver, M. C., U. S. Army; Burlington, Kan.; University of Kansas, Lawrence and Rosedale, 1911; aged 31; a Fellow of the American Medical Association; on duty at Camp Grant, Rockford, Ill.; a specialist on diseases of the eye, ear, nose and throat; died in Camp Grant, about October 6, from pneumonia, following influenza.

Capt. Charles Emmett Varier, M. R. C., U. S. Army, South Bend, Ind.; University of Michigan, Ann Arbor, 1909; aged 34; a Fellow of the American Medical Association, and for one year president of the St. Joseph County Medical Society; under orders to preceed to Camp Zachary Taylor, Louisville; died at his home, October 9, from pneumonia.

Michael Francis Black, New York City; College of Physicians and Surgeons in the City of New York, 1904; aged 40; a member of the Medical Society of the State of New York; attending physician to the Seton Hospital, and chief surgeon to St. Vincent's Hospital, New York City; died at St. Vincent's Hospital, October 5, from pneumonia.

John Joseph Hassett, Lee, Mass.; New York University, New York City, 1887; aged 56; a Fellow of the American Medical Association, and president of the Berkshire County Medical Society; associate medical examiner of Berkshire County; a member of the school board of Lee; died at his home, October 11, from pneumonia.

Lieut. James Allen Etheridge, M. R. C., U. S. Army, Baltimore; Johns Hopkins University, Baltimore, 1916; aged 26; who had spent several months in Flanders with the Johns Hopkins Unit, and was later under treatment for injuries in a hospital in London; died in Johns Hopkins Hospital, Baltimore, October 7, from influenza.

Asst. Surg. John Clinton Bowman, Lieutenant, U. S. N. R. F., Canton, Ohio; Ohio State University, Columbus, 1918; aged 28; a Fellow of the American Medical Association; formerly a practitioner of Thornville, Ohio; died in the U. S. Naval Hospital, Philadelphia, October 2, from pneumonia, following influenza.

John Farrar Hunter, Jackson, Miss.; Tulane University, New Orleans, 1882; aged 58; a Fellow of the American Medical Association; for several years secretary and executive officer of the Mississippi State Board of Health; one of the most prominent physicians of the state; died at his home, October 5, from heart disease.

Harry Burton Stevenson, Baltimore; University of Maryland, Baltimore, 1892; aged 48; at one time a member of the Medical and Chirurgical Faculty of Maryland; president of the Baltimore County Medical Association, and health officer of Baltimore County; died in St. Agnes' Hospital, Baltimore, October 10, from influenza.

Alfred William Berr, Rockville, Conn.; Tufts College Medical School, Boston, 1916; aged 30; formerly a member of the staff of the Lawrence (Mass.) General Hospital; who had been inducted into service and was on duty at Fort Slocom, N. Y.; died in that place, October 8, from pneumonia, following influenza.

Harold R. Dwyer, Chicago, Rush Medical College, 1895; aged 49; at one time a member of the Illinois State Medical Society; an officer of the city health department for sixteen years; high physician of Illinois, United Order of Foresters; died at the Contagious Disease Hospital, Chicago, October 20, from diphtheria.

Charles R. Schoemaker, Baltimore, College of Physicians and Surgeons, Baltimore, 1891; aged 46; at one time a member of the Medical and Chirurgical Faculty of Maryland; a member of the staff of the Presbyterian Eye, Ear, Nose and Throat Hospital, Baltimore; died at his home, October 6, from influenza.

Asst. Surg. Warren A. Van Derveer, Lieutenant (Junior Grade), U. S. Navy, Philadelphia and Mount Holly, N. J.; Hahnemann Medical College, Philadelphia, 1910; aged 31; a Fellow of the American Medical Association; on duty at Portsmouth, Va.; died in the U. S. Naval Hospital in that place, October 7.

Asst. Surg. Michael James Carroll, Lieutenant (Junior Grade), U. S. Navy, Lenox, Mass.; Georgetown University, Washington, D. C., 1910; aged 36; a Fellow of the American Medical Association; on duty at the U. S. Naval Hospital, Newport, R. I.; died in that institution, September 29, from pneumonia.

Myron Allen Boor, Terre Haute, Ind.; Medical College of Indiana, Indianapolis, 1894; aged 46; at one time a Fellow of the American Medical Association; a member of the Indiana State Medical Association; surgeon to St. Anthony's Hospital for more than eighteen years; died at his home, October 9.

Lieut. Hugh Todd Ryan, M. C., U. S. Army, Schuylkill Haven, Pa.; Hahnemann Medical College, Philadelphia, 1914; aged 26; a Fellow of the American Medical Association; on duty at Fort Oglethorpe, Ga.; died in General Hospital No. 14, at that post, October 9, from pneumonia, following influenza.

Act. Asst. Surg. Edward Raymond DeBoth, U. S. P. H. S., Green Bay, Wis.; Rush Medical College, 1911; aged 32; a member of the State Medical Society of Wisconsin; who had applied for and was awaiting commission in the Army; died at his home, October 6, from pneumonia, following influenza.

Thomas Weaver, Nashville, Tenn.; University of Nashville, Tenn., 1897; aged 45; at one time a Fellow of the American Medical Association; for several years attending physician at the Tennessee Industrial School; died in St. Thomas' Hospital, Nashville, October 6, from pneumonia.

Charles Votteler Dorwarth, Philadelphia; University of Pennsylvania, Philadelphia, 1910; aged 31; a Fellow of the American Medical Association; visiting physician to the Polyclinic and Children's hospitals, Philadelphia; died at his home, October 8, from pneumonia, following influenza.

Capt. Howard Bigelow Jackson, M. C., U. S. Army, Melrose, Mass.; Harvard Medical School, 1901; aged 44; a Fellow of the American Medical Association; on duty at Fort Oglethorpe, Ga.; died in the General Hospital at that post, October 13, from pneumonia, following influenza.

Asst. Surg. Douglas Holmes Warner, Lieutenant, U. S. N. R. F., Portland, Ore.; University of Oregon, Portland, 1918; aged 27; a Fellow of the American Medical Association; died in the U. S. Naval Hospital, Bremerton, Wash., October 8, from pneumonia, following influenza.

Felix G. Cross, Cincinnati; Miami Medical College, Cincinnati, 1869; aged 76; president of the Columbia Life Insurance Company; a veteran of the Civil War and for several years surgeon at the Dayton Soldiers' Home; died at his home, October 1, from heart disease.

William Atlee Drysdale, Philadelphia; Jefferson Medical College, 1882; of national repute as a consulting engineer;

a member of the board of examiners of the International Electrical Exhibition, Philadelphia, 1904; died at his home, October 6, from a nervous breakdown.

Arnold Robert Moon, Williamsburg, Iowa; State University of Iowa, Iowa City, 1910; aged 32; a Fellow of the American Medical Association, and secretary of the Iowa County Medical Society; died at his home, October 6, from pneumonia, following influenza.

John Knight Bennett, Gloucester City, N. J.; Jefferson Medical College, 1887; aged 61; a member of the Medical Society of New Jersey; medical inspector of the board of health of Gloucester; died at his home, October 1, from pneumonia.

Robert Earl Harrington, Montville, Conn.; Baltimore Medical College, 1906; aged 34; a Fellow of the American Medical Association; died in the Backus Hospital, Norwich, Conn., September 23, from pneumonia, following influenza.

Joseph David Cohn, Corpus Christi, Texas; Johns Hopkins University, Baltimore, 1911; aged 30; a Fellow of the American Medical Association; and a specialist in genito-urinary diseases; died at his home, September 30, from pneumonia.

John Edward West Thompson, Bridgeport, Conn.; Yale University, New Haven, 1883; aged 68; United States minister to Hayti, under President Cleveland; was stabbed by a former patient at Bridgeport, October 6, and died instantly.

Frances N. Baker, Media, Pa.; Woman's Medical College of Pennsylvania, Philadelphia, 1877; aged 78; a Fellow of the American Medical Association; died in the Woman's Hospital, Philadelphia, September 29, from pneumonia.

George August Colin, Chicago; Illinois Medical College, Chicago, 1903; aged 37; a Fellow of the American Medical Association; also a druggist; died at his home, October, 10, from bronchial pneumonia, following influenza.

William J. K. Kline, Greensburg, Pa.; Long Island College Hospital, Brooklyn, 1863; aged 82; a Fellow of the American Medical Association; died in the Westmoreland (Pa.) Hospital, October 6, from pneumonia.

Hugh B. Reynolds, Escanaba, Mich.; University of Michigan, Homeopathic Medical School, Ann Arbor, 1886; aged 53; a member of the Michigan State Medical Society; died at his home, October 3, from myocarditis.

Julius Bachrach, Joliet, Ill.; Jenner Medical College, Chicago, 1912; Chicago College of Medicine and Surgery, 1912; aged 40; a Fellow of the American Medical Association; died at his home, October 7, from pneumonia.

Frederick Joseph Denning, South Boston; Harvard Medical School, 1908; aged 33; a Fellow of the American Medical Association; died in the Boston City Hospital, September 17, from pneumonia, following influenza.

Clarence Ayers Turner, Middle Point, Ohio; Cleveland-Pulte Medical College, Cleveland, 1913; aged 31; a member of the Ohio State Medical Association; died at his home, October 4, from bronchial pneumonia.

Joseph Franklin Miller, Stroudsburg, Pa.; Medico-Chirurgical College of Philadelphia, 1906; aged 35; a member of the Medical Society of the State of Pennsylvania; died at his home, September 29, from pneumonia.

Jasper N. Clark, Columbus, Ohio; Starling Medical College, Columbus, 1872; aged 74; for thirty-five years a practitioner of Fayette County, Ohio; died at his home, September 29, from cerebral hemorrhage.

Gustavus P. Folks, Waycross, Ga.; Louisville (Ky.) Medical College, 1889; aged 60; at one time a member of the Medical Association of Georgia; died at his home, September 23, from nephritis.

Talcott Ormsbee, Stanley Station, Ore.; American Eclectic Medical College, Cincinnati, 1876; aged 83; died in St. Vincent's Hospital, Portland, Ore., September 11, from shock, following prostatectomy.

Lieut. Morris Finkelberg, M. C., U. S. Army, Spring Valley, Ill.; Loyola University, Chicago, 1908; aged 31; a Fellow of the American Medical Association; was killed in action in France, September 15.

George Wilds Linn, Malvern, Pa.; University of Pennsylvania, Philadelphia, 1872; aged 74; a Fellow of the American Medical Association; a veteran of the Civil War; died at his home, September 26.

Silas Baldwin, Baltimore; University of Maryland, Baltimore, 1867; aged 71; for more than twenty-five years coroner of northwest Baltimore; died at his home, October 2, from cerebral hemorrhage.

A. U. Gressett, Chunkey, Miss. (license, Mississippi); surgeon in the Confederate service during the Civil War; a practitioner for 57 years; died at his home, September 21, from senile debility.

Irving Harry Kaufman, Brooklyn; University and Bellevue Hospital Medical College, 1912; aged 31; adjunct visiting gynecologist to Zion Hospital; died at his home, October 1, from pneumonia.

Louis H. Geiger, Gilman, Ill.; University of Illinois, Chicago, 1903; aged 45; a member of the Illinois State Medical Society; died at St. Luke's Hospital, Chicago, October 9, from diabetes.

David Borger, Hamilton, Ohio; Eclectic Medical Institute, Cincinnati, 1876; aged 75; was found dead from cerebral hemorrhage in a cornfield in his farm, near Hamilton, September 30.

Robert C. Mitchell, Belvidere, Ill.; Chicago Homeopathic Medical College, 1901; aged 49; a Fellow of the American Medical Association; died at his home, October 7, from pneumonia.

William Robert Cluness, Alameda, Calif.; Queens University, Kingston, Ont., 1859; aged 82; at one time a Fellow of the American Medical Association; died at his home, September 26.

Harry William Priem, Chicago; Rush Medical College, 1914; aged 30; a Fellow of the American Medical Association; died at his home, October 9, from pneumonia, following influenza.

Jane Darling Stevenson, Akron, Ohio; University of Michigan, Ann Arbor, 1918; aged 25; an intern in the Philadelphia General Hospital; died in Philadelphia, October 6, from influenza.

John J. Laurans, New Orleans; Tulane University, New Orleans, 1886; aged 56; a Fellow of the American Medical Association; died at his home, September 21, from angina pectoris.

Ray Howard Rice, Delavan, Wis.; Bennett Medical College, Chicago, 1898; aged 44; a Fellow of the American Medical Association; died at his home, October 2, from pneumonia.

William Reginald Chipman, Chelsea, Boston; Harvard Medical School, 1876; aged 69; a member of the Massachusetts Medical Society; died at his home, October 7, from heart disease.

Lieut. Joseph Charles Monnier, M. C., U. S. Army, Cleveland; Western Reserve University, Cleveland, 1917; aged 28; died in Washington, D. C., October 2, from pneumonia.

Lucy Wadsworth Tuck, Boston (license, Massachusetts, years of practice, 1894); aged 90; died at the Home for Aged Women, Roxbury, Boston, September 19.

George W. Farrow, Kansas City, Mo.; Rush Medical College, 1875; aged 76; a Fellow of the American Medical Association; died at his home, September 14.

Morris Weinberg, Philadelphia; University of the South, Sewanee, Tenn., 1904; aged 37; died at his home, October 1, from pneumonia, following influenza.

Florence B. Power, Burlingame, Calif.; Willamette University, Salem, Ore., 1893; aged 50; died in San Francisco, September 29, from carcinoma uteri.

John E. Allder, Cane Hill, Mo.; Kentucky School of Medicine, Louisville, 1876; aged 75; a veteran of the Civil War; died suddenly, September 26.

Horace N. Marvin, Dover, Del.; formerly of Sioux City, Iowa; Hahnemann Medical College, Chicago, 1883; aged 73; died at his home, September 29.

Carl Clifton Stevens, Iron Mountain, Mich.; University of Michigan, Ann Arbor, 1903; aged 37; died at his home, September 30, from pneumonia.

Isaac H. Hague, Shreve, Ohio; University of Wooster, Cleveland, 1868; aged 77; a veteran of the Civil War; died at his home, September 28.

William S. Pitts, New York City; Rush Medical College, 1868; aged 88; died at the home of his son in New York City, about September 26.

William John Truitt, Naperville, Ill.; Hahnemann Medical College, Chicago, 1889; aged 51; died at his home, October 2, from pneumonia.

James F. Doyle, Santa Ana, Calif.; University of Illinois, Chicago, 1886; aged 60; died at his home, October 1.

The Propaganda for Reform

IN THIS DEPARTMENT APPEAR REPORTS OF THE COUNCIL ON PHARMACY AND CHEMISTRY AND OF THE ASSOCIATION LABORATORY, TOGETHER WITH OTHER MATTER TENDING TO AID INTELLIGENT PRESCRIBING AND TO OPPOSE MEDICAL FRAUD ON THE PUBLIC AND ON THE PROFESSION

SULPHERB

"Sulpherb" or "Sulpherb Tablets" is another of the multifarious nostrums sold by the Blackburn Products Company of Dayton, Ohio. In common with their class, they are advertised by the "fake prescription" method, a scheme which gives the reader the impression that the advertisement is really a newspaper "health department." The individual used by the Blackburn concern to carry out this deceit is Lewis Baker, whose activities in this connection we have previously noted. The advertisements appear under the general title, "The Doctor's Advice, by Dr. Lewis Baker." Here are samples of the method by which the public is deceived:

"L. W. writes: 'My blood is in bad condition. I suffer with constipation and my tongue is always coated. My skin is dark and I have pimples. I feel tired all the time, but I am too nervous to sleep. Please prescribe.'

"ANSWER: Get a tube of three-grain sulpherb tablets (not sulphur) and take according to directions. They will clean your blood, aid digestion, and relieve constipation. When you get your blood pure, the other symptoms disappear."

"George asks: 'For several months I have not been feeling well. My skin is sallow, my tongue coated, have headache, am sleepless, nervous and bothered with chronic constipation. Please help me.'

"ANSWER: You need a laxative blood cleansing treatment in the form of three-grain sulpherb tablets (not sulphur). Overcome the tendency to constipation and gradually your good health and pure blood will return."

"Orrie writes: 'I have been taking salts to purify my blood and cure my skin of itching and pimples, but don't get much benefit. Please prescribe for this.'

"ANSWER: I advise three grain sulpherb tablets (not sulphur tablets), composed of sulphur, cream of tartar and vegetable extracts that remove constipation and purify the system. Take this treatment for several months for best results."

The package in which "Sulpherb Tablets" comes bears on the label one of those noninformative, alleged formulas that the shrewd "patent medicine" faker so delights in. No quantities are given, but the public is told that the tablets "contain the extracts or concentrations of Cascara, Aloes, May Apple, Nux-Vomica, Black Cherry, Capsicum, Ginger, Sarsaparilla. Also Calcium Sulphide, Sulphur and Cream of Tartar."

"Sulpherb Tablets" were examined in the A. M. A. Chemical Laboratory, and the chemists report as follows:

"Sulpherb Tablets" are sugar coated, yellow, and weigh about 7.3 grains each, coating and all. The package states that they are three grain tablets; this probably refers to the medicament only. A qualitative examination shows the presence of emodin-bearing drugs, the taste suggesting aloes. Sulphur, calcium, sulphid, traces of alkaloid, potassium, and tartrate are present. The chemical examination shows that "Sulpherb Tablets" are probably compounded from calcium sulphid, sulphur, cream of tartar, and vegetable extractives. Of the vegetable extractives claimed to be present, aloes was indicated and a trace of some alkaloid, the amount of which was too small to permit its identification. If this alkaloid is strychnin, the quantity is insignificant, certainly not more than $\frac{1}{1000}$ of a grain to each tablet.

Here we have, then, a simple laxative tablet, consisting essentially of drugs that have been known and used for generations, both by the medical profession and by the public. It is advertised in a way that is doubly deceitful. First the public is deceived by being led to infer that "Sulpherb Tablets" are extraordinarily efficacious; then it is further deceived by the fakish "health column" and the concealment of the "patent medicine" character of the nostrums that are recommended. Newspapers that accept such advertisements commit more than an offense against the public health; they are, for a consideration, guilty of imposing on the public's confidence by leading their readers to suppose that the "Health Talk" or "Doctor's Advice" is a department of the paper, presenting unbiased information on health subjects. The whole "prescription fake" scheme is a disgraceful combination of nostrum exploitation, quackery and low-grade advertising.

Correspondence

ALKALIS IN THE TREATMENT OF INFLUENZA

To the Editor:—It is universally agreed that in perverted metabolism by bacterial invasion, it is the acidosis that is fatal.

When the system is saturated with alkalis, there is poor soil for bacterial growth. The baneful acids may be neutralized by harmless alkalis, and these seem to act almost specifically. I have uniformly employed, and always with good results, potassium citrate and sodium bicarbonate saturation by mouth, bowel and skin.

For the past three weeks, in the present influenza epidemic, I have seen an average of 100 private patients daily. There have been all degrees of frequency and severity, and in some houses as many as six patients.

As is well known in this epidemic, there has been a very high mortality in cases occurring in pregnant women. I have seen three instances of bronchopneumonia, or "lung patches," in pregnant women, two at term, with complete recovery.

Incidentally, I have made the use of the bed-pan imperative, and have absolutely refrained from administering any of the coal-tar series.

I explain to the afflicted persons that they must be patient, and that the fever, aches and pains are inevitable for a few days, and that they must be willing to forego the seductive relief afforded by acetylsalicylic acid (aspirin), acetanilid and other heart depressants. I employ cold applications and the ordinary stimulation by strychnin, aromatic spirits of ammonia, digitalis, quinin, etc. I have always withheld all depressants.

My very successful experience in this epidemic with the saturation of the system with harmless alkalis cannot be dismissed as accidental or unique. It seems to represent an important new medical fact, or one apparently forgotten or generally overlooked. It is so simple and without any possible objection that I urge its immediate trial empirically. Further investigation in laboratory and clinic may follow later.

THOMAS C. ELY, M.D., Philadelphia.

PRECAUTIONS ON THE PART OF PHYSICIANS TO AVOID INFLUENZA INFECTION

To the Editor:—I believe THE JOURNAL would do service by suggesting precaution that should be practiced by physicians and others in the sick room with influenza patients.

Large numbers of Pennsylvania's physicians are sickening, I am sure, because they are indifferent to danger and careless about protecting themselves from the spray of moisture from the mouth of the patient.

I am getting stories every day by the score of physicians examining the chests of influenza patients in the old careless fashion, leaning over the bed with the patient talking constantly and with no attempt to have the patient cover the cough or sneeze with a towel or handkerchief. The sick rate among physicians and the death rate are appalling, and I believe physicians are needlessly sacrificing themselves because of their failure to fully appreciate what they ought to do.

I have not had time to prepare an article and have only had time to glance over the series of splendid articles illustrated in THE JOURNAL.

Masks if properly used do offer a certain degree of protection apparently and yet the every-day precaution that we practice in handling the tuberculous should be practiced at all times by careful physicians.

B. FRANKLIN ROYER, M.D., Harrisburg, Pa.
Acting Commissioner, Department of Health, Pennsylvania.

TOMATO LEAVES AND DERMATITIS

To the Editor:—I notice in an article on "Dermatitis Lycopersicum Esculentum (Tomato Plant)" by Dr. E. S. Lain (The Journal, Oct. 5, 1918, p. 1114) that after a brief search he was unable to find the tomato plant mentioned as a cause of skin eruption. In Norman Walker's "Introduction to Dermatology," Edition 6, p. 109, it says, "The following are some plants and woods which have been proved to cause dermatitis . . . tomato leaves (*Lycopersicum esculatum*)."

Malcolm MacKay, M.D., Sherbrooke, Quebec.

THE V. M. S. C. AND THE SELECTIVE SERVICE

To the Editor:—Desiring information for my own guidance in making selection of physicians for appointment as examiners on Local Boards and Medical Advisory Boards, I made inquiry of the Provost Marshal-General's Office in reference to the use, if any, he had directed should be made of the Volunteer Medical Service Corps. His reply may be useful to medical aides and others, and I send it to you for publication with the sanction of General Crowder.

John M. Dodson, M.D., Chicago.

General Crowder's letter says in part:

. . . . the Provost Marshal-General has had no thought of employing the Volunteer Medical Service Corps, as an organization, for any purpose, nor has any need for its aid arisen. On the other hand, many of its members have doubtless been utilized, individually, in the physical examination of drafted men. The medical profession has given most earnest and whole-hearted support to the work of the Selective Service, and no unofficial intermediary is required between its members and the Provost Marshal-General.

F. H. Crowder, Provost Marshal-General.

Queries and Minor Notes

Anonymous Communications and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

VENTILATION ABOARD SHIP

To the Editor:—Will you kindly inform me how many cubic feet of air an hour a man on board ship should have?

F. D. German, M.D., Franklin, Mich.

Answer.—Where possible an adult should have an air supply of 3,000 cubic feet an hour, never less than 2,000. However, there are many factors affecting this point. When the air in a given space is changed oftener than three or four times an hour, the minimal air supply would be 3,000 divided by 4, or 750 cubic feet per man per hour. The subject is fully discussed in Pryor: Naval Hygiene, Philadelphia, P. Blakiston's Son & Co., price $3. Several chapters are devoted to the problems of air and ventilation aboard ship.

Paper Famine.—There was a paper famine in Europe in the seventh century. In A. D. 640 the Saracens conquered Egypt, and at the same time, by the Order of Omar, their caliph, the renowned library at Alexandria, consisting of 400,000 volumes, was burnt. The paper supply of the then world was derived from the papyrus bark, a reed which grew only in Egypt. Consequently, when the Saracens gained possession of the country the paper supply was cut off. This led to the adoption of a curious expedient. The writing on used papyrus paper was erased and the paper, which was thus made available, again brought into use. An old author has suggested that probably owing to this, many valuable contributions from classic writers, Tacitus, Livy and others, were lost to the world. But in this ancient expedient we have a hint for the present. There must be thousands of households lumbered with books of no value and many libraries with volumes occupying shelf space uselessly. In every household and every library these books should be "combed out," and the paper sent back to the mills. Paper is wanted; such books are not.—*Med. Press and Circular.*

Medical Education and State Boards of Registration

COMING EXAMINATIONS

Arkansas: Little Rock, Nov. 12-13. Sec., Regular Bd., Dr. T. J. Stout, Brinkley, Ark.; Sec., Eclectic Bd., Dr. C. E. Laws, 803½ Garrison Ave., Ft. Smith.

Connecticut: New Haven, Nov. 12-13. Sec., Regular Bd., Dr. C. A. Tuttle, 196 York St., New Haven; Sec., Eclectic Bd., Dr. James E. Hair, 730 State St., Bridgeport; Sec., Homeopathic Bd., Dr. E. C. M. Hall, 82 Grand Ave., New Haven.

Iowa: Des Moines, Dec. 10-12. Sec., Dr. G. H. Sumner, Capitol Bldg., Des Moines.

Louisiana: New Orleans, Dec. 2-4. Sec., Dr. E. W. Mahler, 730 Audubon Bldg., New Orleans.

Maine: Portland, Nov. 12-13. Sec., Dr. Frank W. Searle, 776 Congress St., Portland.

Maryland: Baltimore, Dec. 10. Sec., Dr. J. McP. Scott, 137 W. Washington St., Hagerstown.

Massachusetts: Boston, Nov. 12-14. Sec., Dr. Walter P. Bowers, No. 1 Beacon St., Boston.

Nebraska: Lincoln, Nov. 13. Sec., H. P. Lehnhoff, 514 First Natl. Bk. Bldg., Lincoln.

Nevada: Carson City, Nov. 4. Sec., Dr. S. L. Lee, Carson City.

Ohio: Columbus, Dec. 3-5. Sec., Dr. H. M. Platter, State House, Columbus.

Texas: Dallas, Nov. 19-21. Sec., Dr. M. F. Bettencourt, Mart.

Virginia: Richmond, Dec. 10-13. Sec., Dr. J. W. Preston, 215 S. Jefferson St., Roanoke.

West Virginia: Charleston, Nov. 19-21. Sec., Dr. S. L. Jepson, Masonic Bldg., Charleston.

Arkansas Eclectic May Examination

Dr. C. E. Laws, secretary of the Arkansas Eclectic Medical Board, reports the written examination held at Fort Smith, May 13-15, 1918. The examination covered 12 subjects and included 120 questions. An average of 75 per cent. was required to pass. Twenty-seven candidates were examined, all of whom passed. The following colleges were represented:

College	Passed	Year Grad.	Per Cent.
California Eclectic Medical College		(1915)	88.1
American Medical College		(1896)	85.9
Kansas City College of Med. and Surg.	(1918)		81.4, 81.7, 82.6, 83.4, 84.3, 84.7, 84.7, 85, 85.1, 85.5, 86.2, 86.5, 86.7, 86.7, 87.5, 87.8, 88.1, 88.8, 89.1, 89.3, 89.6, 89.7, 90.3.
Lincoln Medical College	(1918)		87, 87.8

One candidate, a graduate of the American Medical College in 1906, received a license that had been revoked for one year.

New Mexico July Report

Dr. W. E. Kaser, secretary of the New Mexico Board of Health and Medical Examiners, reports that 8 candidates were licensed on credentials and 1 candidate was licensed through reciprocity at the meeting held at Sante Fe, July 8-9, 1918. The following colleges were represented:

College	Licensed on credentials	Year Grad.	No. Licensed
Rush Medical College	(1882)	(1916)	2
Louisville Medical College		(1896)	1
Tulane University		(1911)	1
Starling Medical College		(1888)	1
Pulte Medical College		(1892)	1
Medical College of the State of South Carolina		(1904)	1
University of Texas		(1896)	1

College	Licensed through reciprocity	Year Grad.	Reciprocity with
University of Arkansas		(1910)	Arkansas

West Virginia Reciprocity Report

Dr. S. L. Jepson, health commissioner of the West Virginia Public Health Council, reports that 16 candidates were licensed through reciprocity including up to July 9, 1918. The following colleges were represented:

College	Licensed through reciprocity	Year Grad.	Reciprocity with
American Medical Missionary College		(1902)	Tennessee
Kentucky School of Medicine of Louisville		(1903)	Kentucky
University of Louisville		(1890)	Kentucky
Tulane University		(1914)	Louisiana
University of Maryland	(1908)	(1915)	Maryland
Marion-Sims College of Medicine		(1897)	Missouri
Eclectic Medical College		(1905)	Illinois
Jefferson Medical College		(1914)	Penna.
Medical College of Virginia	(1898) (1906) (1909)	(1910,2)	Virginia
University College of Medicine		(1908)	Virginia
Queen's University		(1908)	Indiana

Book Notices

THE DIAGNOSIS AND TREATMENT OF VENEREAL DISEASES IN GENERAL PRACTICE. By L. W. Harrison, D.S.O., Lecturer on Venereal Diseases and Officer in Charge, Military Hospital, Rochester Row. Cloth. Price, $7.50. Pp. 482, with 100 illustrations. New York: Oxford University Press, 1918.

Harrison has had in view a book that will bring home to the general practitioner his responsibility in the care of venereal diseases, will interest him in them, and will show him how relatively simple and satisfactory their treatment is, once the knowledge of how to treat them has been mastered. To this end he has omitted the highly technical procedures that only the expert can carry out well, and has given full space to the simpler measures, which are all that are required in the great majority of cases. This is a difficult task and requires judgment as well as a knowledge of the subject based on large experience. Fortunately the author has had this experience in civil and military practice, and brings to the subject a maturity of judgment that has enabled him to select the essential parts. The result is a book which the expert may well consult, but which is particularly useful to the general practitioner. In it he finds the well-tried methods clearly described, the important things stressed, so that he is not left in uncertainty as to what course he should follow by a multiplicity of detail which leaves him finally in confusion. It is an excellent book. Its publication is timely, and its circulation will be beneficial to the medical profession and to the public, who have a right to expect from their medical advisers intelligent care of these diseases.

A LABORATORY MANUAL OF ELEMENTAL QUALITATIVE CHEMICAL ANALYSIS FOR STUDENTS OF MEDICINE, DENTISTRY, PHARMACY AND SCIENCE. By A. R. Bliss, Jr., A.M., Phm.D., M.D., Professor of Pharmacology, School of Medicine, Emory University. Second edition. Cloth. Price, $2.25 net. Pp. 194. Philadelphia: W. B. Saunders Company, 1918.

What was written about the first edition of this book applies with almost equal force to this edition. It is true that some of the glaring errors pointed out in our previous review have been corrected, and an attempt, at least, has been made to have the book conform more to the modern theories as applied to chemical analysis. There is, however, nothing new or unique either in the subject-matter or in the arrangement. There are in existence many textbooks dealing with this subject, and why there should be added this one we fail to see, unless it be as we said before simply to attach one's name to a collection of well known facts presented under the camouflage of a nice appearing book.

AIDS TO RATIONAL THERAPEUTICS WITH U. S. A. PHARMACOPEIA EQUIVALENTS. By Ralph Winnington Leftwich, M.D., C.M., M.R.C.S. Cloth. Price, $1.50. Pp. 233. New York: William Wood & Co., 1918.

The author has placed all diseases in forty groups on the basis of their pathology and similarity of treatment, believing that this is the simplest way to teach therapeutics. This conception has some commendable features. The book will not, however, be of much value to American physicians because the prescriptions are long and complicated, many of the ingredients are drugs that are not even slightly used in this country, and many of the preparations recommended will not bear the scrutiny of scientific investigation.

EMERGENCIES OF A GENERAL PRACTICE. By Nathan Clark Morse, A.B., M.D., F.A.C.S., Surgeon to Emergency Hospital, Eldora, Iowa. Cloth. Price, $4.50. Pp. 449, with 251 illustrations. St. Louis: C. V. Mosby Company, 1918.

The author has discussed briefly all the emergency methods of a general practice. Many subjects are, of course, only enumerated. It seems a mistake to attempt to cover a field that includes the reduction and maintenance of fractures, the treatment of compound fractures, amputations, obstetric emergencies and infected wounds in so brief a way as is necessary in a volume no larger than this. The explanations are explicit and the illustrations well selected.

Medicolegal

Damages Recoverable for Miscarriage

(Wallace v. Portland Railway, Light and Power Company (Ore.), 170 Pac. R. 283)

The Supreme Court of Oregon reverses a judgment obtained by the plaintiff for damages for a miscarraige alleged to have been caused by the defendant's negligence in suddenly starting a street car from which the plaintiff was alighting, in which she claimed damages not only for the injuries and pain she suffered, but also for the loss of her child. The court says that there can be no question that a plaintiff, a pregnant woman, may recover for the pain and injury, both physical and mental, experienced by her from a miscarriage brought about by the negligent act of a defendant. She is entitled to have nature in such cases work out its proper function in due time. Any disturbance of the period or process of gestation resulting in her injury is actionable. It is only, however, for the injury to her that she can recover. She has no action for the loss of the child. The injury, if any, is too remote and speculative to form a basis for damages. Furthermore, the court holds that the defendant was not helped by an assignment of error in a refusal of the trial court to allow a witness called for the defendant to answer whether or not she was told by the plaintiff and her husband, prior to the occurrence of the accident, that they were contemplating an operation on the plaintiff. It was true that if the defendant could have shown that the plaintiff and her husband brought about the miscarriage in question by some act of their own, it would have been material to the defense; but the mere expression of an intention to have an operation performed was of no moment whatever, unless followed by testimony tending to show that the intent was carried into execution. The trial judge was clearly right in excluding the proffered testimony, as it did not appear by the record that there was any effort to supplement the offer by proof of any overt act of the plaintiff or her husband committed with a view to produce an abortion.

Cost of Operation Added to Alimony

(Rotge v. Rotge (Colo.), 171 Pac. R. 360)

The Supreme Court of Colorado affirms a judgment in favor of the plaintiff, who asked that the defendant be required to pay the necessary expenses—hospital bill and surgeon's fee—incurred for an operation which it had become necessary for her to undergo while a suit for divorce was pending between them and after she had been awarded $125 a month temporary alimony. The court says it was conceded that the surgeon who performed the operation had sued the parties to this suit before a justice of the peace and recovered judgment against both for the amount of his fee, but nothing had been recovered on the judgment, though the defendant had been garnisheed as being indebted to the plaintiff, and had answered thereto, admitting his indebtedness for the monthly alimony due. The court thereupon found the issues in favor of the plaintiff, and that the expenses of the operation and hospital bill were an unforeseen contingency, for which no provision had been made by the court and that the bills were just, and ordered that the defendant pay the hospital bill and the judgment for the surgeon's bill rendered in the justice court, and that the payment of these amounts should in no wise be deducted from or in any way affect the temporary alimony required by prior order of the court to be paid by the defendant to the plaintiff each month. Continuing, the supreme court says that the ordinary rule that, when in a divorce suit temporary alimony has been awarded the wife and the husband duly pays it, he will not be liable thereafter for necessaries subsequently furnished her, had no application to the facts of this case. It might be that the husband, in this case, might have avoided the judgment against himself in

the justice court by making the defense here suggested. This he did not do, and the finding was that a judgment was rendered therein against both of the parties hereto and stood unpaid. While it was the debt of the husband, it was likewise the debt of the wife, and the substantial effect of the order was that the husband furnish her with money to pay her debt. If compliance with the order incidentally satisfied a judgment against the husband, it in no wise affected this controversy. The question here related to the power of the district court, in which the divorce suit was pending, to increase the payments required to be made by the husband during the pendency of the suit, to meet the needs of the wife which had arisen because of changed conditions, and had nothing to do with the rights of third parties as against the husband. But the order directing the defendant to pay the hospital bill incurred by the plaintiff, and the judgment in favor of the surgeon for his services, is modified to require him to pay the necessary amount into the court to be used by the plaintiff in the discharge of such indebtedness, instead of requiring him to pay it directly to persons not parties to the suit.

Society Proceedings

COMING MEETINGS

American Public Health Association, Chicago, Dec. 9-12.
Assn. for S. & P. of Inf. Mort., Asheville, N. C., Nov. 11-14, 1918.
Medical Association of Porto Rico, Ponce, Dec. 14-15.
Southern Medical Association, Asheville, N. C., Nov. 11-14, 1918.
Southern Surgical Association, Baltimore, Dec. 17-19.
Western Roentgen Society, Chicago, Nov. 20-22.

AMERICAN ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS

Thirty-First Annual Meeting, held at Detroit, Sept. 16-18, 1918

(*Concluded from page 1840*)

Sarcoma of the Left Ovary in a Child Twenty-Three Months Old

Dr. Herman E. Hayd, Buffalo: A small round cell sarcoma of the right ovary, about the size of a goose egg, was removed from a baby aged 23 months. The child's temperature was 101 F. It was peevish and irritable, and lost considerable flesh, had been sick about ten days, was cutting the eye teeth, and had some bronchitic sounds in the chest, with areas of bronchopneumonia in both lungs. The liver dulness was much increased. The bowels and kidneys were functionating satisfactorily. In the lower right abdominal quadrant could be felt a large, movable, smooth tumor, not painful to the touch. We treated the symptoms, irrespective of the abdominal condition. In the course of four or five days the temperature became normal, the child began to play, took considerable semisolid food, the tongue cleared up, the feverish condition of the mouth and lips passed away, and the mother was told to take the child into the country and to return in a few weeks or earlier, if the child's condition did not continue to improve. The child remained at home for ten or twelve days, when I saw it again. The lungs were clear, but the abdomen contained considerable fluid, and the mass, which was still movable, was tender. The temperature was 100 F.; the child looked sick and was again fretful and irritable. She was prepared for operation immediately. The tumor was free in the abdomen, with the right tube attached to it. The appendix was long and curled on itself, and it was also removed. The uterus and the left tube and ovary were normal. Quite a little bloody fluid ran away when the abdomen was opened. The liver was palpated and found to be much enlarged and filled with nodular masses. The child suffered little shock and recovered from the operation, leaving the hospital on the thirteenth day. It died at the end of the fifth week, no doubt from exhaustion with acute hepatitis and, perhaps, general sarcomatosis.

DISCUSSION

Dr. Thomas B. Noble, Indianapolis: My experience with sarcoma of the ovary comprises four cases in children, three of whom are dead. One, a girl of 16 who was operated on four years ago, is living.

Do Not Sterilize Women when Operating for Tuberculous Peritonitis

Dr. J. Henry Carstens, Detroit: Thousands of tuberculous nodules are left in the abdomen which are absorbed and disappear; hence we have a right to believe that the few nodules that are on the tubes and ovaries will also disappear after we open the abdomen with or without irrigation or drainage. There is no use in removing the tubes if they are only affected by tubercles. Many of the women are young and unmarried, and should not be sterilized needlessly.

Intestinal Actinomycosis

Dr. John W. Keefe, Providence, R. I.: Actinomycosis of the digestive tract practically never occurs in the stomach or small intestine, possibly because the acid contents of the stomach and the fluid secretions found in the small intestine are less irritating to its mucous lining. An acute or chronic inflammation of the appendix may open the door for the entrance of the actinomycotic organism. Actinomycosis is practically never carried by the lymphatics and but rarely by the blood stream. The method of extension is by continuity of tissue. Hence, general actinomycosis, unlike tuberculosis and blastomycosis, is extremely rare.

The early diagnosis of actinomycosis is generally overlooked. A firm swelling, painless on pressure, occupying either the right or left inguinal regions, usually the right, is the sign most frequently found in cases of intestinal actinomycosis.

The surgical measures to combat the disease consist of excision in some cases and incision in others, and curetting of diseased tissues together with the use of antiseptics and the maintenance of free drainage. Injections of 4 per cent. aqueous solution of liquor formaldehydi have been employed with success. Vaccines and serums have been found of value only in a few reported cases. The roentgen ray has not shown any marked beneficial effect. In a few instances radium has been given with marked immediate results. Large doses of potassium iodid, 90 grains, three times a day, have been given with success in many cases. The marked efficacy claimed for this drug is readily explained by the fact that it promotes the absorption of granulation tissue, acting in very much the same manner as in the case of granulomas of tertiary syphilis.

The Rôle of Congenital Colonic Membranes as a Causative Factor in Disease

Dr. J. P. Runyan, Little Rock, Ark.: Colectomy is a radical operation for the relief of intestinal stasis, and in the skilled hands of Lane may be fairly safe; but it has always appeared to me to be unjustifiable, provided a simpler and a safer operation could be devised. Acting on the hypothesis that intestinal stasis is due to colonic membrane formation, the result of imperfect embryologic development, which membrane causes more or less angulation of the bowel, we began dividing or removing this membrane with most gratifying results. It is a splendid, safe and sane substitute for colectomy in the treatment of intestinal stasis, and an operation devoid of mortality.

DISCUSSION

Dr. William Seaman Bainbridge, New York: Constipation is a symptom just as diarrhea is a symptom. The worst cases of stasis are those in which the condition is accompanied frequently with diarrhea. The frequency of the number of stools does not mean that the putrefying and noxious material is not there. The retained stool is being absorbed. There is an overflow of retention in the bowel just as there is overflow of retention in the bladder. That point Mr. Lane has emphasized repeatedly, and the worst cases of stasis are of that type. When the intestinal canal is dammed, the body as a whole or in part cannot take care of the added amount of poisoning which such retention involves. As to treat-

ment, to say that Mr. Lane or any of those that follow him advocate colectomy for stasis is so radical that it does harm. Lane put himself on record in regard to that in 1901 when he said that nine tenths of the patients with stasis ought never to see a surgeon.

DR. JAMES E. DAVIS, Detroit: The body in its development usually follows the law that function determines anatomic form. With some arrest in the embryonic development, no interference with normal function occurs; but there are cases in which the arrested anatomic form does interfere definitely. I performed a necropsy on a child that illustrates this point. A child, aged 6 weeks, died apparently of symptoms of inanition. The right lobe of the liver appeared displaced well down into the pelvis; in fact, it seemed to be a development and a displacement. The gallbladder was in a right angled position with the midaxis of the bowel. The lower border of the right lobe of the liver was down in the lowermost part of the pelvis. Through the right hernial ring the cecum and appendix were herniated. The symptomatology was something like this: For the first four days after birth there was no trouble whatever; then there appeared a train of gastro-intestinal disturbances, and a little later metabolic disturbances were found. The terminal picture was that of ordinary inanition. In my judgment this abnormality of position was the etiologic factor of the gastro-intestinal and metabolic disturbances.

DR. GORDON K. DICKINSON, Jersey City, N. J.: In the June, 1918, issue of the *Annals of Surgery* is published a very interesting article on the anatomy and embryology of the subject under discussion. I have forgotten the name of the author. His observations are based on embryologic researches, the literature and otherwise. He says that all these bands are of embryonal origin and can be traced back to the very early period of fetal life.

DR. HUGO O. PANTZER, Indianapolis: We find these conditions often associated with a narrow costal angle with visceroptosis, congenital defects, and so on. By percussion one can tell whether the cecum is over the brim or not. By auscultation and percussion much can be learned about the abdominal contents.

Current Medical Literature

AMERICAN

Titles marked with an asterisk (*) are abstracted below.

Annals of Otology, Rhinology and Laryngology, St. Louis

June, 1918, **27**, No. 2

1 Report on Otolaryngology in First Year of War. H. P. Mosher, Washington.—p. 437.
2 Case of Otogenous Temporal Abscess with Hemiplegia, Facial Paralysis and Aphasia: Cerebral Drainage, Decompression, Recovery. O. Glogau, New York.—p. 456.
3 Pathology of Sinus Thrombosis. A Braun, New York.—p. 461.
4 Indications for Variations in Technic in Tonsillectomy. C. L. Adams, Kokomo, Ind.—p. 474.
5 Reactions of Normal Labyrinth: Experience in U. S. Aviation Examinations. H. Hastings, Los Angeles.—p. 481.
6 Case of Neuritis of Eighth Nerve Involving Both Branches from Focal Infection in Appendix. G. W. Mackenzie, Philadelphia. —p. 490.
7 Gasparo Tagliacozzi and His Contribution to Rhinoplasty.—M. and I. Frank, Chicago.—p. 505.
8 Examination of Applicants for Aviation Service, U. S. Army. W. A. Scruton, New York.—p. 528.
9 Infections of Paranasal Sinuses in Infants and Young Children. L. W. Dean, Iowa City, Iowa.—p. 534.
10 Adenocarcinoma of Nose; Four Cases. L. M. Hurd, New York. —p. 557.
11 Foreign Body (Carpet Tack) Remaining Two Years in Bronchial Tube without Pathologic Symptoms. D. Roy, Atlanta.—p. 565.
12 Blastomycosis of Upper Respiratory Tract: Case Primary in Larynx. F. L. Dennis, Colorado Springs.—p. 571.
13 Case of Granuloma of Mastoid Simulating Subperiosteal Abscess. J. D. Richards, New York.—p. 587.
14 Case of Mastoidectomy for Acute Suppurative Otitis Media, Followed Later by Facial Paralysis, Almost Total Deafness, Meningitis and Death. J. R. Page, New York.—p. 589.
15 Cases of Vincent's Angina. C. F. Theisen, Albany, N. Y.—p. 594.
16 Radical Treatment of Peritonsillar Abscess. C. F. Theisen, Albany, N. Y.—p. 600.
17 Syphilitic Necrosis of Intermaxillary Bone. C. W. Richardson, Washington, D. C.—p. 605.
18 Two Cases of Unusual Wounding of Lateral Sinus. V. Dabney, Washington, D. C.—p. 607.
19 Digest of American and English Otologic Literature for Year 1917. O. M. Rott, Spokane, Wash.—p. 609.
20 Abscess of Left Frontal Lobe Following Suppuration of Frontal Sinus; Report of Case and Exhibition of Specimen. W. V. Mullin, Colorado Springs.—p. 667.
21 Bone Transplantation for Correction of Nasal Deformities. W. F. Callfas, Omaha.—p. 672.
22 Lothrop Operation for Frontal Sinusitis; Report of Two Cases. J. J. Pattee, Pueblo.—p. 677.
23 Nose and Throat in Medical History. D. A. Vanderhoof, Colorado Springs.—p. 685.
24 Relation of Blood Pressure to Pathologic Conditions of Head and Neck. T. E. Carmody, Denver.—p. 691.

Annals of Surgery, Philadelphia

September, 1918, **68**, No. 3

25 *Preliminary Report of Method for Estimating in Vivo Germicidal Activity of Antiseptics. J. A. Perkins.—p. 241.
26 Treatment of Gunshot Fractures of Mandible. J. B. Roberts, Philadelphia.—p. 245.
27 Operative Treatment of Hernia: Analysis of Eight Thousand, Five Hundred and Eighty-Nine Cases. W. B. Coley and J. P. Hoguet, New York.—p. 255.
28 Case of Lipoma of Funiculus Spermaticus. H. Schiller, Chicago. —p. 269.
29 Fecal Fistula Following Strangulated Hernia: Report of Five Cases. W. D. Haggard, Nashville, Tenn.—p. 272.
30 Traumatic Abdomen. J. B. Deaver, Philadelphia.—p. 275.
31 Acute Pancreatitis. J. B. Deaver, Philadelphia.—p. 281.
32 Incidence of Calculi in Gallbladder in One Thousand Six Hundred Necropsies. L. J. Mitchell, Chicago.—p. 289.
33 Kidney Ureter Abnormalities; Two Cases. T. N. Hepburn, Hartford, Conn.—p. 294.
34 *Diverticula of Bladder. E. S. Judd, Rochester, Minn.—p. 298.
35 Treatment of Wounds of Genital Organs in Warfare. C. G. Cumston, Geneva, Switzerland.—p. 306.
36 Anatomic Methods of Approach in Operations on Long Bones of Extremities. J. E. Thompson, Galveston, Texas.—p. 309.
37 Lengthening of Achilles Tendon in Treatment of Complicated Pott's Fracture. C. N. Dowd, New York.—p. 330.
38 *Receiving and Operating Pavilions for Modern Base Hospital. A. P. C. Ashhurst, Philadelphia.—p. 333.
39 Treatment of Malignant Peritonitis of Ovarian Origin; Two Cases. E. A. Codman, Boston.—p. 338.

25. **Germicidal Activity of Antiseptics.**—With a view to reducing the margin of error in estimating the bacterial contents of a wound with microbe charts Perkins and his associates have been culturing the wounds, counting the number of colonies and plotting curves as in microbe charts. In order to reduce so far as possible the element of the personal equation, the work has been done by one man. The inoculations were made from the same part of the surface of the wound, one definite spot being selected and used throughout; the attempt was made to get a uniform-sized drop; the same platinum wire loop was used each time. The drop obtained was inoculated at the bedside in 2 c.c. of plain bouillon, the bouillon suspension, undiluted, was immediately poured over an agar-agar plate, which was then covered and turned upside down and marked with the patient's number, the number of the culture, and the time the culture was taken. The plate was then taken to the laboratory and placed in an incubator and kept at 37 C. At the end of twenty-four hours the colonies were counted, macroscopically, and recorded. Carrying out this procedure during different stages of wound treatment with antiseptics some idea can be obtained of the comparative strength of antiseptics and the length of time during which they are active when applied to human tissues in the presence of infection.

34. **Diverticula of Bladder.**—During a period of ten years forty-four patients were operated on in the Mayo Clinic for bladder diverticula. Judd says that diverticulum of the bladder is much more common than has been realized. The condition is perfectly amenable to surgical treatment. In this series of forty-four patients, so far as is known, all but ten are living. Two of the patients died within a few days after a drainage operation; both of these men had septic kidneys and drainage was of no avail. The other deaths occurred after the patients had been up and around for some time, and in most instances after they had gone home. The

general and functional results in the remaining thirty-four patients have been uniformly good. The functional result, in so far as emptying the bladder is concerned, may, Judd says, be slow to adjust itself, though eventually it will be practically perfect.

38. **Receiving and Operating Pavilions for Modern Base Hospital.**—Ashhurst describes the adaptation of standard barrack buildings to the uses of receiving, bathing, operating, and roentgen-ray pavilions in a base hospital. The buildings described form part of Base Hospital 34, American Expeditionary Forces, which is situated in the outskirts of a large city, at a considerable distance from the front.

American Journal of Physiology, Baltimore

September, 1918, **47**, No. 1

40 *Action of Pituitary Extract on Kidney. F. P. Knowlton and A. C. Silverman, Syracuse, N. Y.—p. 1.
41 *Effect of Food in Increasing Oxidation. W. E. Burge and A. J. Neill, Urbana, Ill.—p. 13.
42 *Material Lost in Menstruation of Healthy Women. L. H. Gillett, L. Wheeler and A. B. Yates, New York.—p. 25.
43 Muscular Strength and Muscular Symmetry in Human Beings. E. G. Martin and W. H. Rich.—p. 29.
44 Significance of Undissociated Carbon Dioxid in Respiration. R. W. Scott, Cleveland.—p. 43.
45 Differences in Catalase Content of Muscle from Different Parts of Stomach. W. C. Alvarez and E. Starkweather, San Francisco.—p. 60.
46 Catalase Content of Mucous Membrane from Different Parts of Digestive Tract. W. C. Alvarez and E. Starkweather, San Francisco.—p. 67.
47 *Comparison of Activity of Extracts of Pars Tuberalis with Extracts of Other Regions of Ox Pituitary. W. J. Atwell and C. J. Marinus, Ann Arbor, Mich.—p. 76.
48 Studies on Physiology of Reproduction in Birds. Effects of Quinin on Production of Egg Yolk and Egg Albumen. O. Riddle and C. E. Anderson, Long Island, N. Y.—p. 92.
49 Postmortem Melanin Pigment Formation in Pigmentless Retinas and Choroids of White Ring Doves. O. Riddle and V. K. La Mer, Long Island, N. Y.—p. 103.
50 *Chemical Composition of Brain of Normal and Ataxic (?) Pigeons. M. L. Koch and O. Riddle, Long Island, N. Y.—p. 124.
51 New Form of Aerotonometer. P. M. O'Sullivan, Toronto.—p. 137.
52 Lung as an Aerotonometer. P. M. O'Sullivan, Toronto.—p. 143.
53 Heat Liberated by Beating Heart. C. D. Snyder, Baltimore.—p. 156.

40. **Action of Pituitary Extract on Kidney.**—Knowlton and Silverman found that the oxygen consumption by the kidney is not increased during the diuresis induced by pituitary extracts. Using the oxygen consumption as the criterion, there is no evidence that pituitary extract stimulates the renal cells. Throughout their experiments increased blood flow through the kidney was an invariable accompaniment of pituitary diuresis. From the evidence at hand it seems possible to explain the diuretic action of pituitary extract entirely on the basis of the vascular changes and increased filtration pressure obtaining in the kidney.

41. **Effect of Food in Increasing Oxidation.**—The increase in oxidation following the ingestion of food is attributed by Burge and Neill to the increase in catalase produced by the stimulation of the digestive glands, particularly the liver, to an increased output of this enzyme. The glycerin radical of the fat molecule is responsible for the stimulating effect of the fats; the end products of protein digestion, presumably the amino-acids, for the stimulating effect of meat; and the simple sugars for the stimulating effect of the starchy foods.

42. **Material Lost in Menstruation of Healthy Women.**—In the experiments referred to the subjects were healthy women who were working in the laboratory from ten to twelve hours a day. In general the object was to ascertain whether the calcium and phosphorus requirements of women differed materially from those of men. The diet of each subject was uniform from day to day and the daily intake and output for nitrogen, calcium and phosphorus were determined by analysis. The data obtained show that there is no pronounced periodicity in the output of phosphorus and calcium and that the amounts of these elements lost in menstruation are not sufficient to make the nutritive requirements of women for these elements materially different from those of men of the same weight.

47. **Extracts of Several Parts of Ox Pituitary.**—According to Atwell and Marinus a pars tuberalis may be distinguished in the bovine hypophysis. It differs histologically from both the pars intermedia and the pars anterior propria. But, extracts of the pars tuberalis are very inferior to extracts of the pars intermedia in producing contractions of the isolated uterine segment and are likewise inferior to extracts of the neural stalk in raising the blood pressure of the dog. Extracts of the pars tuberalis equivalent to 5 mg. of fresh gland substance failed to produce a rise of blood pressure in the rabbit. It is believed that the active effects displayed by extracts of the pars tuberalis are due to an inclusion of some of the neural stalk substance during the preparation of the extract. It would seem improbable that the pars tuberalis is responsible for the origin of active principles which increase uterine contraction or raise the blood pressure. An extract of the pure pars intermedia of the ox is capable of producing a strong pressor effect when injected intravenously into the dog. An extract of pure pars intermedia representing 5 mg. of the fresh gland substance produces a distinct rise of blood pressure in the rabbit. An extract of the pure neural stalk is fairly powerful in producing a rise of blood pressure in the dog. This removes one objection to the possibility that the secretion of the pars intermedia passes into the neural lobe and then, via the neural stalk, into the third ventricle.

50. **Chemistry of Brain of Normal and Ataxic Pigeons.**—The brains of birds which have very little control of the voluntary movements (ataxia?) were analyzed by Koch and Riddle. The data thus obtained are compared with similar data obtained on the brains of normal birds of the same parentage. The derangement first appeared (mutation?) under conditions known to lead to weakness in the offspring. The disorder is exhibited in all degrees and has been inherited undiminished to the fifth generation. Usually it is shown from the earliest age of the bird and is probably present throughout the whole development of the bird. The brains of the affected birds show increased values for moisture, protein and extractive sulphur; decreased values for lipoids, phosphatids and cholesterol. In general the less ataxic individuals show values intermediate to those of the normals and most ataxic. The distribution of sulphur and phosphorus in the various chemical fractions was determined. The results of the analyses of the affected brains are interpreted as suggesting a chemical underdifferentiation or immaturity of these brains. The brains of affected birds of approximately mature age are chemically more like the brain at earlier stages of development.

Archives of Internal Medicine, Chicago

September, 1918, **22**, No. 3

54 *Study of Eighty Cases of Empyema at Camp Upton. H. Brooks and R. L. Cecil, Camp Upton, N. Y.—p. 269.
55 *Voluntary Acceleration of Heart Beat. H. F. West and W. E. Savage, Boston.—p. 290.
56 *Acute Endocarditis Following War Wounds. H. T. Karsner, France.—p. 296.
57 Pathologic Report on Forty-Three Cases of Acute Poliomyelitis. H. L. Abramson, New York.—p. 312.
58 Aberrant Electrocardiogram Associated with Sclerosis of Atrioventricular Bundle Branches and Their Terminal Arborizations. E. P. Carter, Cleveland.—p. 331.
59 *Epidemic of Mumps at Camp Wheeler, October, 1917-March, 1918. M. J. Radin, Camp Wheeler, Ga.—p. 354.
60 Study of Eight Cases of Acute Nephritis. D. W. Atchley, New York.—p. 370.

54. **Empyema at Camp Upton.**—Eighty cases of a highly virulent type of empyema have been analyzed by Brooks and Cecil at Camp Upton in a series of 300 pneumonias. Fifteen of these were caused by the pneumococcus; fifteen others were sterile; the remainder of the cases were caused by streptococcus, usually of the hemolytic type. In this series of cases empyema has been constantly associated with pneumonia of either the bronchial or lobar type. Usually a bronchopneumonia has accompanied a streptococcus empyema, and a lobar pneumonia the pneumococcus empyemas. In the great majority of cases the organism which has been found

to be the causative agent in the pneumonia has also been isolated in pure culture from the pleural exudate. In nine cases, however, a pneumococcus pneumonia was associated with a streptococcus empyema. The onset of the pneumonia and the empyema is apparently simultaneous in some cases. This epidemic of empyema has been, in large part, independent of measles and other similar infections.

The clinical symptoms and the physical signs differ from those of classic empyema. Diagnosis is frequently difficult by reason of the equivocal physical signs and the indefinite symptomatic picture. Diagnostic aspirations are the most certain means of discovery of the condition in its early stage. The roentgen ray stands second in diagnostic importance. Of the physical signs, alterations in percussion seem to be the most helpful. The interstitial type of bronchopneumonia, recently described by Cole and MacCallum, is usually found associated with streptococcus empyema. Fibrinopurulent pericarditis is the most frequent complication. Pyopneumothorax has also been observed in a number of cases. The mortality rate is high and the prognosis is serious. Medical treatment is essentially expectant. The most efficacious method of surgical treatment and the correct time for its application are yet to be determined.

55. **Acceleration of Heart Beat.**—A young medical student who is entirely healthy and is apparently free from all physical and neurotic defects has had no cardiovascular symptoms whatever and physical examination shows the heart to be of normal size and free from abnormal sounds and murmurs. Attacks of tachycardia have never been noticed. He discovered the ability to increase his heart rate voluntarily during the course in physiology in his freshman year and has practiced it only at times of making observations. During the period of acceleration there is a very slight increase in the rate and the depth of respiration and the pupils dilate moderately as recorded by other observers. No definite physical effort is made, but constant mental concentration must be maintained, which, after several, closely repeated trials, becomes quite fatiguing. The rate begins to increase almost immediately following the word of command and reaches its maximum after about ten heart cycles. All tracings show a decrease in amplitude of the pulse waves rather than an increase with marked dicrotism. There was a distinct rise in blood pressure with each acceleration with the exception of the effort at the height of the atropin effect, when there was a drop of 10 mm. from the reading made five minutes before. The latter reading, however, was 10 mm. higher than the first record made before the atropin was given. The greatest increase noted was one of 18 mm. accompanying an acceleration of 27 beats per minutes.

Electrocardiograms show no distinctive characteristics other than a slight notching of R and a diphasic T in the third lead. There is a definite, but not unusually marked, sinus arrhythmia. During the periods of acceleration there was no change in the P-wave, in the P-R interval, nor in the distance from the beginning of R to the end of T. The amplitude of T was not changed. There was some rhythmic variation in the height of R both before and during the period of acceleration. The general average of the R deflections was slightly lower during the periods of acceleration, but by not more than one tenth of the height preceding the increased rate. After subcutaneous injection of 0.002 gm. of atropin sulphate the rate was increased from 69 to 94 beats per minute. Electrocardiograms taken at this time show a very slight increase in the amplitude of T in the first lead and a correspondingly slight decrease in the height of R. No change in the distance from the beginning of R to the end of T could be made out. The sinus arrhythmia was almost, but not completely, obliterated. When respirations were forced without atropin the sinus arrhythmia becomes more marked.

56. **Endocarditis and War Wounds.**—Acute endocarditis was observed by Karsner in fourteen necropsies. Twelve were pure acute disease and two showed acute lesions superimposed on preceding chronic lesions. The twelve acute cases showed involvement of the aortic valve alone in five cases; the mitral, two cases; the pulmonary, one case; the tricuspid, one case; combined mitral and aortic, three cases. One case showed chronic mitral stenosis with acute mitral and aortic lesions; one case showed chronic mitral and aortic stenosis with acute mitral lesions. *Staphylococcus pyogenes-aureus* was isolated in three cases, two of which were pyemias and one was a septicemia. *Streptococcus pyogenes* was isolated in nine cases, two of which were pyemias and seven were septicemias. Two cases were clinically and pathologically septicemias, but were not demonstrated to be so bacteriologically. All the patients had suffered serious primary wounds, five of which involved joints and four others of which involved other serous cavities. These wounds are irregularly distributed in regard to the valves attacked except that both the cases showing superimposition of acute on chronic lesions were penetrating wounds of the pelvis. In contrast to these figures, there were six cases of infected wounds of the joints which failed to show endocarditis, twenty-three cases of wounds of other serous cavities not including head wounds and forty-two cases of septicemia or pyemia without noticable lesions of the endocardium.

59. **Epidemic of Mumps at Camp Wheeler.**—Among approximately 18,000 men at Camp Wheeler, there were 5,756 cases of mumps, an incidence of 32 per cent. Every third man in the division, in other words, has had mumps. Of 13,638 total admissions to the hospital to March, 1918, almost one half were mumps—42.2 per cent. The cost of the epidemic to the government was at least $1,000,000. Six hundred and eleven had testicular involvement of various kinds. Suppurative otitis media occurred in twenty cases. Pancreatitis occurred in fourteen cases. Five cases of lobar and one case of bronchopneumonia occurred. There were nine cases of bronchitis of the ordinary type and course. Radin says that the most diagnostic prodromal sign, pathognomonic, in fact, was first noted by Lieutenant Hathcock. The sign is tenderness just beyond the angle of the jaw on running the finger toward the angle, under the mandible. If the parotid gland is at all involved, the patient winces with pain. This occurs before any swelling can be made out. It is almost constant, it is early, it is definite and it is exclusive; therefore it is diagnostic.

Boston Medical and Surgical Journal

Oct. 3, 1918, **179**, No. 14

61 *Kidney Function in One Hundred Cases of Hypertension. W. C. Rappleye, Foxborough.—p. 441.

61. **Kidney Function in Cases of Hypertension.**—A study of the blood urea nitrogen, elimination of phenolsulphonephthalein and urine analysis was made by Rappleye on 100 cases of elevated blood pressure, using the figure of 150 to 155 mm. systolic pressure as the low value for selection. With but four or five exceptions, the patients were in apparently good physical condition and active, none showed any edema, dyspnea, fever or other compromising conditions. In this group of patients 70 per cent. showed blood urea nitrogen values below 16.0 mg. per 100 c.c. (whether considering the whole group or only those showing a systolic value of over 170 mm. or a diastolic figure of over 100 mm.), and 66 per cent. showed a dye excretion of 40 per cent. or higher; 16 per cent. showed a value of 40 per cent. A slightly lower percentage was found in those patients showing a higher blood pressure (systolic of 170 mm. or over, diastolic of 100 mm. or over). Twenty-eight per cent. showed both a urea nitrogen of 16.0 mg. or over and a dye excretion of 40 per cent. or less. Ninety per cent. of the cases showing a urea nitrogen of 16.0 mg. or over had a dye excretion of 40 per cent. or less. Twenty-four of the cases showed a blood pressure over 160 mm., a urea nitrogen below 15.0 mg. and a phthalein over 50 per cent. There have been thirteen deaths in this group with eleven necropsies. The causes of death in ten of the thirteen cases were associated with either the cardiovascular system or acute infections.

Bulletin of Canadian Army Medical Corps, Ottawa

September, 1918, **1**, No. 6

62 Typhoid Spine. W. Osler.—p. 78.
63 Nature of Shell Shock. F. Dillon.—p. 79.
64 *Early Stages of Trench Nephritis. G. S. Strathy.—p. 83.
65 Botulism. E. C. Dickson.—p. 85.
66 Some Aspects of Military Ophthalmology. S. H. McKee.—p. 87.

64. **Treatment of Early Stages of Trench Nephritis.**—Strathy says that with rest in bed and a simple diet of milk and milk puddings the large majority of patients improve rapidly. The symptoms calling for active treatment are cough, dyspnea, decrease in urine, headache and convulsions. At the casualty clearing station in which Strathy was stationed if a patient was markedly edematous or his blood pressure high a hot-air bath was given. In nearly all cases this produced free sweating, relieved the cough and headache, and decreased the edema. The patient's bowels were kept fairly free with Epsom salt, but the patients were not severely purged. If the dyspnea did not then subside and was severe, oxygen inhalations almost invariably gave considerable relief. After losing two patients whose deaths were both directly due to the affection of the lungs and pleurae, oxygen treatment was given to all cases of extreme dyspnea, and apparently carried several severe cases through, but when the dyspnea was not relieved by oxygen, and later, when the use of oxygen was forbidden owing to shortage of oxygen supply, aspiration of the hydrothorax was carried out, and immediate improvement resulted. One patient who was in extremis and appeared likely to die within five minutes was aspirated. After the removal of the fluid he was immediately improved and ultimately recovered. The hydrothorax did not recur. Opium in any form for the relief of cough or sleeplessness Strathy abandoned after some unhappy results from its use. It appeared to increase the patient's cyanosis. For convulsions spinal puncture and withdrawal of fluid was done in three out of four cases. The three recovered and the unpunctured patient died. Strathy believes it should be done either when an attack of convulsions is threatening, or as soon after the first convulsion as possible. One-fourth grain of morphin was always given at the onset of a convulsion.

Bulletin of John Hopkins Hospital, Baltimore

September, 1918, **29**, No. 331

67 *Sinus Spud. W. S. Halsted.—p. 195.
68 Medical Industrial Relations of War. D. L. Edsall, Boston—p. 197.
69 Thymus Tumor Associated with Acute Lymphatic Leukemia. R. H. Major, Rosedale, Kan.—p. 206.
70 Wit and Satire on Physician in Hebrew Literature. H. Friedenwald, Baltimore.—p. 209.

67. **Sinus Spud.**—Four cases are cited by Halsted. The nature of the tumors or spuds was the same in the four cases. In the three perineal cases the pictures, were, in every particular, so nearly identical that, presumably, they had also a cause in common. In one instance a urethral fistula developed two years after the excision of the sinus and its fibrous wall. Halsted says that from this we might naturally conclude that a urethral lesion was responsible for all of the perineal spuds, notwithstanding the fact that no one of the three patients could recall having had at any time a urethritis. But this patient had been treated for fistula-in-ano a year before his perineal tumor appeared, and another patient had been operated on for hemorrhoids. In two cases operated on by Halsted, he felt that he could assert positively that at the time of operation the sinus did not communicate with either rectum or urethra. In both of these cases, furthermore, the sinus did not extend in either direction, to the end of the spud. The original urethral or rectal openings must have been very minute and have become closed.

In the three perineal cases the situation of the spud was precisely the same, and the dissection in the two operated cases led to the same spot, namely, to neighborhood of the bulbomembranous urethra. If the three cases had been of rectal origin it is extremely unlikely that the rectal perforation would in each have been identically at the same point. Correct interpretation of the condition is important, although failure to recognize the nature of the tumor could hardly be disastrous. Faulty diagnosis, however, caused three of the patients great distress. A finger-shaped, subcutaneous tumor of the perineum, quite free at its tip and with the hardness and elasticity of cartilage, is probably a sinus spud and may be recognized almost at the first touch of the palpating finger.

Florida Medical Association Journal, Jacksonville

September, 1918, **5**, No 3

71 Diagnosis of Laryngeal Tuberculosis. F. J. Walter, Daytona.—p. 41.
72 Malaria and Multimillionaire. E. Van Hood, Ocala.—p. 42.

Indiana State Medical Association Journal, Fort Wayne

September, 1918, **11**, No. 9

73 Epidemic Streptococcus Infection of Nose and Throat Clinically Considered. W. A. Hollis, Hartford City.—p. 327.

Iowa State Medical Society Journal, Des Moines

September, 1918, **8**, No. 9

74 Strouse's Method of Treating Dropsy. M. H. Thielen, Grundy Center.—p. 317.
75 History of Medicine in Iowa. D. S. Fairchild, Clinton.—p. 320.
76 Treatment of Empyema. C. A. Hedblom, Rochester, Minn.—p. 328.
77 Plastic Surgery of Face and Neck. J. H. McGready, Independence.—p. 332.
78 Myocarditis; Its Recognition and Treatment. J. R. Walker, Fort Madison.—p. 334.

Journal of General Physiology, Baltimore

September, 1918, **1**, No. 1

79 Dynamics of Photosynthesis. W. J. V. Osterhout and A. R. C. Haas, Cambridge.—p. 1.
80 Method of Studying Respiration. W. J. V. Osterhout, Cambridge.—p. 17.
81 *Antagonism Between Thyroid and Parathyroid Glands. E. Uhlenhuth, New York.—p. 23.
82 *Further Proof of Existence of Specific Tetany-Producing Substance in Thymus Gland. E. Uhlenhuth, New York.—p. 33.
83 Difference in Action of Radium on Green Plants in Presence and Absence of Light. C. Packard, Woods Hole, Mass.—p. 37.
84 Amphoteric Colloids. Chemical Influence of Hydrogen Ion Concentration. J. Loeb, New York.—p. 39.
85 *Theory of Mechanism of Disinfection, Hemolysis and Similar Processes. S. C. Brooks, Boston.—p. 61.
86 Law Controlling Quantity of Regeneration in Stem of Bryophyllum Calycinum. J. Loeb, New York.—p. 81.
87 Reversal of Reaction by Means of Strychnin in Planarians and Starfish. A. R. Moore, New Brunswick, N. J.—p. 97.
88 Light and Muscle Tonus of Insects. Heliotropic Mechanism. W. E. Garrey, New Orleans.—p. 101.
89 Lutear Cells and Hen-Feathering. A. M. Boring and T. H. Morgan, New York.—p. 127.

81. **Antagonism Between Thymus and Parathyroid Glands.**—From the facts stated by Uhlenhuth it is evident that the thymus gland of mammals contains a substance which is capable of producing tetany when fed to the larvae of certain species of salamanders (*Ambystoma opacum* and *Ambystoma maculatum*). As long as the larvae have not developed their own thymus glands, they are able, by means of some mechanism, to counterbalance the tetanic action of the thymus substance introduced in their food. When, however, the secretion from their own thymus glands is added to the thymus material introduced with the food, this mechanism of preventing tetany becomes inadequate and tetany ensues. If the thymus is the organ by whose action tetany is produced, Uhlenhuth says, we can understand why tetany in human beings occurs far more frequently in children than in adults, since in the latter the thymus gland is replaced, at least to a great extent, by connective tissue. The relation of thymus to tetany may also possibly explain the occurrence of tetany during pregnancy; while the parathyroids of the mother may be sufficient to prevent tetany from her largely atrophied thymus, they may not be sufficient to prevent tetany from the excess of thymus substance furnished by the fetus to the blood of the mother.

82. **Tetany-Producing Substance in Thymus Gland.**—Uhlenhuth believes that the effect of the thymus gland in producing tetany is due to a specific tetany toxin produced by and contained in the thymus, hence the thymus gland must be added to the group of glands for which the function of internal secretion has been demonstrated.

85. **Mechanism of Disinfection and Hemolysis.**—Brooks presents a critical discussion of the part played by the physicochemical process or group of processes leading to death, laking, and similar effects in determining progressive changes in the number of individual cells succumbing in

successive units of time to the action of the deleterious agent. He believes that the course of such processes as hemolysis is very largely dependent on variations in resistance among the different individuals, and secondarily on the course of the fundamental reaction. The fundamental reaction may be either a simple process, or the expression of a complex series of changes whose rate is at all times governed by that of the slowest of the series.

Journal of Nervous and Mental Disease, Lancaster, Pa.

September, 1918, **48**, No. 3

90 *Relation of Tuberculosis to Dementia Praecox. E. E. Southard and M. M. Canavan, Boston.—p. 193.
91 Case of Spina Bifida Occulta in Third Cervical Vertebra. S. N. Clark, Chicago.—p. 201.
92 Pathology of Human and Experimental Poliomyelitis. H. S. Howe, New York.—p. 206.

90. **Relation of Tuberculosis to Dementia Praecox.**—On account of a recent revival of interest in the relation between tuberculosis and dementia praecox, a brief statistical inquiry was made by Southard and Canavan, using data of the Massachusetts necropsy series. It was shown that dementia praecox, found in 8 per cent. of 5,040 Massachusetts necropsies, was far more apt to be terminated by tuberculosis than manic depressive psychosis, occurring in 7 per cent. of the basic series. One hundred and twenty of 403 dementia praecox patients died of tuberculosis, and but forty-three of 339 manic depressive psychosis patients died of tuberculosis. Eighty-seven cases of dementia praecox showed neither death due to tuberculosis or any other anatomic feature whatever (even including adhesions in various parts of the body) which would conceivably be related with tuberculosis. Ninety-five cases of manic depressive psychosis were equally free from tuberculosis.

The question whether these nontuberculous cases of dementia praecox were actually victims of the disease and not subject to erroneous diagnosis was taken up in the statistical study from the Danvers symptom catalog from which thirty-six deaths from tubercle were taken to contrast with twenty-seven deaths without the slightest evidence of tuberculosis whatever. Some of the most characteristic symptoms of dementia praecox were found equally distributed in the two groups and strongly represented in both, so that no major doubt can be raised as to the accuracy of the diagnosis of dementia praecox in the nontuberculous group. For example, the fundamental symptoms of dementia and delusions of paranoid type are found equally represented in both. Nor was it found that the fundamental symptom dementia was more frequently shown in the fatally tuberculous cases than in the others.

Tuberculosis appears to dispose certain cases to catatonia and to hyperkinetic symptoms of a presumably psychogenic or cortical nature. Per contra, the nontuberculous cases showed more instances of the peripheral symptom, motor restlessness, than did the tuberculous cases. Another hypothesis raised by this statistical study is whether tuberculosis does not cause a trend of symptoms in dementia praecox over toward manic depressive psychosis. Does not the superposition of a somatic feature like tuberculosis on the encephalic or psychogenic picture of dementia praecox cause also a superposition of sundry features showing an alliance with those of manic depressive psychosis? Or, does not tuberculosis tend to make dementia praecox look more at times like manic depressive psychosis than dementia praecox is ordinarily likely to look?

Journal of Pharmacology and Experimental Therapeutics, Baltimore

August, 1918, **12**, No. 1

93 *Noninfluence of Rise in Body Temperature Induced by Drugs on Protein Quotient and Leukocytes. F. McC. Hill, San Francisco —p. 1.
94 Detoxifying Action of Sodium Salt on Potassium Salt in Guinea-Pig. S. Amberg and H. F. Helmholz.—p. 19.
95 Acridity of Some Plants Due to Mechanical Action. E. D. Brown and D. D. Anderson, Minneapolis.—p. 37.
96 *Tonus Waves from Sino-Auricular Muscle Preparation of Terrapin as Affected by Epinephrin. C. M. Gruber and C. Markel, Denver.—p. 43.
97 *Tonus Waves in Terrapin Auricles as Affected by Pilocarpin, Atropin and Epinephrin. C. M. Gruber and C. Markel, Denver. —p. 53.

93. **Rise in Body Temperature Induced by Drugs.**—The drugs used by Hill in these experiments were the fluidextract of ergot and a saturated solution of calcium lactate. Fluidextract of ergot in doses of from 1 to 1.5 c.c. per kilogram body weight administered intravenously to rabbits induced a steady rise of body temperature from 1.5 to 2.2 C. Higher doses proved fatal. Calcium lactate in doses of from 5 to 8 c.c. of a 1:20 solution administered intravenously to rabbits caused an initial fall of from 0.4 to 0.6 C. in temperature accompanied in the higher doses by symptoms of calcium poisoning. This was succeeded by a strong rise of from 1.5 to 2.5 and disappearance of the symptoms of poisoning. Higher doses were fatal. In sublethal doses, neither fluidextract of ergot or calcium lactate caused any decisive alteration in the protein quotient or the leukocyte count. These experiments show that the aseptic fever induced by these drugs causes no alteration in the globulin content of the blood nor does any alteration of note occur in the leukocyte count.

96. **Auricular Tonus Waves as Affected by Epinephrin.**—These experiments were performed on the hearts of twenty-seven terrapin immersed in Ringer's solution. Epinephrin caused a disappearance or a diminution in the tonus waves in all hearts. In those experiments in which the strength of the solution was strong the waves ceased almost at once. In those in which a more dilute solution was employed only a few tonus waves appeared after its addition to the Ringer's solution. No oxygen was used during the first mentioned observations, whereas continuous oxygen was employed throughout the second set of experiments.

97. **Auricular Tonus Waves as Affected by Pilocarpin.**—Pilocarpin hydrochlorid was found to have a marked effect on the contractions of the heart, almost completely stopping them, but has no effect on the tonus waves. Atropin sulphate increases the general tonus of the heart when injected into the solution in which the muscle is contracting, either in the normal solution or following the administration of pilocarpin. It has only a slight effect, if any, on the tonus waves increasing them along with the general tonus. Epinephrin chlorid or epinephrin (crystalline epinephrin) cause a disappearance of the tonus waves in the atropinized heart as it does in the normal heart.

Medical Record, New York

Oct. 5, 1918, **94**, No. 14

98 Modern Treatment of Gallstone Disease as Affected and Controlled by Duodenal Intubation. J. C. Hemmeter, Baltimore.—p. 575.
99 Plea for More Systematized Study of Patient's Life Needs. J. S. Doubleday, New York.—p. 583.
100 Internal Use of Radium. D. C. Moriarta, Saratoga Springs. —p. 586.
101 Overflowing Tears (Epiphora) and Its Management. J. A. Kearney, New York.—p. 587.
102 Pyorrhea Alveolaris. M. B. Saunders, Waco, Texas.—p. 589.

New York Medical Journal

Oct. 5, 1918, **108**, No. 14

103 General Diagnostic Study by Internist. L. F. Barker, Baltimore. —p. 577.
104 Recurrent Teratomatous Growth of Trachea. W. Freudenthal, New York.—p. 582.
105 Ten Thousand Wassermann Tests. During 1916 and 1917 in Philadelphia General Hospital. R. C. Rosenberger, Philadelphia. —p. 584.
106 Acidosis. C. D. Waltz, Cleveland.—p. 585.
107 Sarcoma of Brain. H. M. Fisher and A. G. Ellis, Philadelphia. —p. 590.
108 Pilocarpin in Chronic Deafness. C. M. Sautter, New York.—p. 592.
109 Asphyxiation—Respiration—Circulation. P. A. Kane, Chicago.—p. 592.

Surgery, Gynecology and Obstetrics, Chicago

October, 1918, **27**, No. 4

110 *Repair of Large Gaps in Peripheral Nerves by Neuroplasty: Cases. K. A. J. Mackenzie, Portland, Ore.—p. 353.
111 Surgical Considerations of Peripheral Nerve Injuries. B. Stookey, Ann Arbor, Mich.—p. 362.
112 Improvements in Reconstructive Surgery of Head. J. B. Roberts, Philadelphia.—p. 369.

113 Application of Teachings of War Surgery to Civil Hospital Conditions. J. A. Hartwell and E. F. Butler, New York.—Jp. 377.
114 Preparation of Neutral Solution of Chlorinated Soda from Liquid Chlorin by Gravimetric Method. S. R. Benedict, New York. —p. 386.
115 Reconstruction and Repair of Hepatic and Common Bile Ducts; Implantation of Hepatic Duct into Duodenum. W. F. Fowler, Rochester, N. Y.—p. 387.
116 Congenital Hernia of Diaphragm; Two Cases. W. A. Downes, New York.—p. 393.
117 Intrathoracic Goiter. O. F. Lamson, Seattle.—p. 397.
118 *Fibroid Tumors of Uterus Treated by Radium. H. A. Kelly, Baltimore.—p. 402.
119 Cancer of Rectum. J. M. Lynch, New York.—p. 410.
120 *Practical Method of Foreign Body Localization. A. H. Busby, New York.—p. 413.
121 Inflammatory Neoplasms of Intestine Simulating Malignancy: Cases. N. M. Jones and A. A. Eisenberg, Cleveland.—p. 420.
122 Congenital Polycystic Kidney; Four Cases Occurring in Children of Same Mother. R. E. Wobus, St. Louis.—p. 423.
123 Roentgenologic Aspects of Hour-Glass Stomach. R. D. Carman, Rochester, Minn.—p. 426.
124 *Pulmonary Edema During Pregnancy; Two Cases. K. C. McIlwraith and W. A. Scott, Toronto, Ont.—p. 438.
125 *Temporary Internal Fixation of Compound Fractures. W. L. and C. P. Brown, El Paso, Texas.—p. 440.
126 Method of External Fixation for Fractured Femur. E. L. Eliason, Philadelphia.—p. 443.
127 Late Perforation of Typhoid Ulcer; Laparotomy Under Novocain Anesthesia; Recovery. H. C. Cooney, Princeton, Minn.—p. 447.
128 Army Cystoscopic Table. A. H. Peacock, Camp Lewis, Wash. —p. 447.

110. **Repair of Large Peripheral Nerve Gaps by Neuroplasty.**—The conclusions reached by Mackenzie from the study of three cases are: Regeneration and recovery of function is promoted by the use of nerve flaps. Both central and peripheral flaps can be used for such purposes. A peripheral flap, by laying down a nerve path, may promote regeneration over a great gap; in one case quoted regeneration occurred over a gap 10¾ inches in length. The approximation of nerves and their repair should be done in all cases with the least possible delay. (This would apply as well to cases which are infected as to clean cases.) The arrest of trophic shock can be promoted by early closure of large gaps by flaps. Unimpaired nerve tissue should always be utilized for the effective repair of damaged nerves. In their repair, nerves can be successfully sequestrated in muscular tissue so as to promote their own regeneration and that of the muscles in which they are embedded. The principle of sequestration can be utilized in proper cases so as to avoid infected zones in wounds and also scars and other obstacles to nerve repair.

118. Abstracted in THE JOURNAL, June 22, 1918, p. 1976.

120. **Foreign Body. Localization.**—The method described by Busby is said to enable the operator to ascertain the depth of foreign bodies in a simple, practical manner, eliminating all mathematical problems, the reading or compilation of charts, at the same time minimizing the technic and thereby removing many possibilities of error. It is not necessary to know the distance of the tube from the patient, nor the distance from the screen to the skin, nor the distance the tube moves on a horizontal plane. Any actual measurement of these factors may be disregarded, yet the correct depth of the foreign body may be read on a scale of millimeters immediately after the operation is completed. This method is based on the fact that the two opposite sides of the parallelogram are equal in distance, one from the other, as described by Barret and Andrault.

124. **Pulmonary Edema During Pregnancy.**—The authors cite two cases of acute pulmonary edema occurring during pregnancy, one at six months and the other at eight months. In both cases the outstanding feature was a tremendously high blood pressure. In the first case, apart from the urinary findings, there was very little else to be discovered before the onset of the acute symptoms. The second case, had a considerable amount of edema elsewhere in the body, but in the first case this edema was confined to the lungs. In neither case, so far as could be discovered, was there any preexisting cardiac lesion. These patients can hardly be said to be eclamptic because they had no convulsions, nor did they die in coma without convulsions. The condition is interpreted as being due to a profound toxemia giving rise to a high blood pressure which finds its outlet in a spot of weakened resistance in the lung. These cases show that blood pressure findings are the best indications regarding the severity of a given case of preeclamptic toxemia. Moreover, in dealing with albuminuria and high blood pressure during pregnancy one should have in mind not only the possibility of a development of convulsions but also that at any time a complication far more tragic than the ordinary eclampsia may arise.

125. **Temporary Internal Fixation of Fractures.**—The Browns endorse temporary fixation of a fracture, preferably with the Parham-Martin band, or, if not feasible, with a Lane's plate; this fixation to be removed under local anesthesia as a rule at the end of five or six weeks. In cases of compound fractures where interference is otherwise indicated for the control of hemorrhage, removal of foreign bodies, disinfection or coaptation of fragments, they have found nothing to contraindicate the use of internal fixation with the express idea of removing it as soon as there has been sufficient callus and fibrous tissue formed to hold the fragments in apposition. They are unable to see any comparison between this method, where the above procedures are otherwise found necessary, and that of transfixation by means of screws or pegs driven into bones for the purpose of making extension. The internal fixation frequently reduces or solves the problem of extension.

Survey of Head Surgery, Washington, D. C.

October, 1918, **1**, No. 3

129 New Camp Disease of Larynx: Pneumococcus Ulcerative Laryngitis. F. D. Owsley, San Antonio, Texas.—p. 94.

Texas State Journal of Medicine, Fort Worth

September, 1918, **14**, No. 5

130 Anatomic Methods of Approach in Operations on Long Bones of Lower Extremity. J. E. Thompson, Galveston.—p. 188.
131 Reaction Following Blood Transfusion by Sodium Citrate Method. V. C. Hunt, Rochester, Minn.—p. 192.
132 Technic of Supravaginal Hysterectomy. G. V. Brindley, Temple. —p. 195.
133 Study of Pathologic Conditions which Impair Quality, Pitch and Tone in Voice Production. L. H. Lanier, Texarkana.—p. 197.
134 Treatment of Intestinal Amebiasis. H. G. Walcott, Dallas.—p. 199.

FOREIGN

Titles marked with an asterisk (*) are abstracted below. Single case reports and trials of new drugs are usually omitted.

British Medical Journal, London

Sept. 14, 1918, **2**, No. 3011

1 *Differential Diagnosis between Functional and Organic Paraplegia. R. T. Williamson.—p. 275.
2 An In Vitro Method of Demonstrating Return Immigration of Leukocytes in Blood Clots and in Wound Tissues. C. J. Bond. —p. 277.
3 Musculospiral Nerve Disabilities. A. V. Clarke and N. I. Spriggs.—p. 280.
4 Epidemic of Fifty Cases of Influenza Among Personnel of Base Hospital, B. E. F., France. C. J. Martin.—p. 281.
5 Three Cases in Which Laminectomy for Removal of Shell Fragments from Spinal Canal was Performed. C. F. M. Saint.— p. 282.
6 *Value of Flavine. H. M. Savery.—p. 283.
7 Extension Apparatus for Fracture of Femur. D. W. Crile.— p. 284.
8 Six Cases of Ruptured Spleen (All Recovered). R. Jamison. —p. 285.
9 *Operation for Varicose Veins. F. J. Steward.—p. 286.

1. **Diagnosis of Functional and Organic Paraplegia.**—When the diagnosis has been especially difficult, or the symptoms slight and indefinite, the three indications of organic disease which Williamson has found of the greatest service have been the Babinski or Oppenheim reflex, the loss of the Achilles tendon reflex, and the loss of the vibrating sensation, while other forms of sensation are unaffected. The onset of a number of organic affections are: paresis with loss of the Achilles tendon reflex, as in early anterior poliomyelitis—chronic, subacute or acute; paresis with loss of the plantar reflex and loss of the Achilles tendon reflex (in many organic diseases); paresis with double sciatica and loss of the Achilles tendon reflexes, as in early cauda equina lesions;

paresis with loss of the Achilles tendon reflex, loss of the vibrating sensation, and pains in the legs, as in early peripheral neuritis; loss of the vibrating sensation with very slight incoordination and very slight paresis, with or without a Babinski reflex, as in early combined posterolateral degeneration of the cord; paresis, with Babinski reflex (in many organic affections); paresis with loss of the vibrating sensation and Babinski reflex (in the early stages of several organic diseases of the cord); root pains, or root symptoms, followed after a period of weeks or months by paresis, as in meningeal spinal tumor.

6. **Value of Flavine.**—Savery endorses the use of flavine in septic injuries. He points out that a few essential facts must be borne in mind for the use of flavine: 1. In the first place it is imperative that all affected parts should be reached so far as possible, and in order to carry this out thoroughly he always endeavors to introduce flavine solution by means of a hypodermic or dental syringe. 2. The flavine soaked gauze should always be applied as wet as possible and any cavities filled up with the solution immediately before, and the part covered with a piece of mackintosh and wool. 3. A third important feature is the duration of the use of flavine; if applied continuously, a yellowish pellicle will appear on the surface of the wound in the course of a few days. This pellicle appears to be composed of leukocytes and fibrin. The best results from flavine have been obtained from its early application and the appearance of the pellicle is an indication that a change should be made, for example, to cusol, brilliant green, or magnesium sulphate, on the fourth day or thereabouts, and then to revert to flavine once in every three days. This method has given great satisfaction. An enormous amount of sepsis would be prevented by the primary use of flavine, and therefore its use is advocated by Savery in every case septic or likely to become septic.

9. **Operation for Varicose Veins.**—The simpler method of excision is endorsed by Steward as being the most useful operation in these cases. Suitable incisions are made and the veins removed, the cut ends of the main veins and the larger tributaries being ligatured with fine catgut. The incisions are then closed by means of Michel's clips, the limb wrapped in large sterile pads, and a bandage applied evenly and firmly, but not too tightly, from the foot upward.

Edinburgh Medical Journal

September, 1918, **21,** No. 3

10 Acute Intussusception of Colon in Adult. J. M. Graham.—p. 128.
11 Unusual Case of Suicidal Gunshot Wound. B. J. Ryrie.—p. 135.
12 Training of Student of Medicine: Education of Students in Venereal Diseases. L. W. Harrison.—p. 138.
13 Id.: Teaching of Tuberculosis for Undergraduates. R. Philip.—p. 145.
14 Id.: Teaching of Infectious Diseases. C. B. Ker.—p. 151.
15 Id.: Teaching of Surgical Tuberculosis. J. Fraser.—p. 154.
16 Id.: School Education of Girl Candidates for Profession of Medicine. B. Smith.—p. 160.
17 Id.: Relation of School Education to Study of Medicine. J. Alison.—p. 165.
18 Id.: School Curriculum of Boys who Intend to Become Medical Students. C. Stagg.—p. 169.
19 Id.: Science Teaching in Secondary Schools, Especially in Relation to Preliminary Scientific Subjects of Medical Curriculum. M. McC. Fairgrieve.—p. 173.

Journal of Laryngology, Rhinology and Otology, London

September, 1918, **33,** No. 9

20 Pulmonary Collapse, Consequent on Papillomata of Larynx; Unrelieved by Tracheotomy; Death. C. H. McIlraith.—p. 257.
21 Intrinsic Cancer of Larynx and Operation of Laryngofissure. I. Moore.—p. 260. To be continued.

Journal of Tropical Medicine and Hygiene, London

Sept. 2, 1918, **21,** No. 17

22 Paramycetoma. A. J. Chalmers and R. G. Archibald.—p. 177.
23 Obscure Case of Malaria. C. S. Crispin.—p. 179.
24 Passing of Bilharzia Worms in Urine. J. B. Christopherson and J. R. Newlove.—p. 180.

Lancet, London

Sept. 14, 1918, **2,** No. 4959

25 *Prevention and Arrest of Lice-Borne Diseases by New Methods of Disinfection. W. Hunter.—p. 347. To be continued.
26 *Rôle of Scapula in Thoracoplasty. J. E. Adams.—p. 351.
27 *Gunshot Wounds of Knee Joint with Septic Arthritis. A. Neve.—p. 353.
28 Three Plastic Facial Operations. R. Lake.—p. 354.
29 Failure of Treatment of Malaria by Diiodoluargol. W. A. Murray and R. W. H. Row.—p. 355.
30 Breast Feeding: Faradisation of Mammary Glands. E. S. Chesser.—p. 356.
31 Natural Science in Education. E. H. Starling.—p. 365.

25. **Disinfection in Lice-Borne Diseases.**—Hunter describes the railway van disinfector devised by Lieut.-Col. G. F. Stammers, R. A. M. C., to meet the needs of disinfection of troops on a larger scale, and to form a part of the British Sanitary Train for Inoculation and Disinfection. The principle of action of the van disinfector is disinfection by current steam, supplied by and directly discharged in greatest volume and force into one or two ordinary railway vans (suitably adapted) by the railway engine, which conveys them along the line to the place most conveniently adjacent to the troops. The cost of adaptation is only $150 to $200, the working of it simple and easy. Each double van is capable, if fully employed, of carrying out disinfections at the rate of 500 kits with 1,000 blankets and 500 overcoats every two hours; of 2,000 kits with 4,000 blankets and 2,000 overcoats in a day of eight hours; of disinfecting over 10,000 kits with 20,000 blankets and 10,000 overcoats in four days; and 18,000 kits with 36,000 blankets and 18,000 overcoats in nine days.

With one disinfector alone Hunter has disinfected the kits and blankets of a hospital with 1,000 beds in four hours; the kits, blankets, and camp bedding of 4,000 prisoners of war in sixteen hours; of 1,500 camel corps men in about twelve hours. Divisions of troops can be dealt with at the following rate: 8,000 men in four days, 15,000 in twelve days (3,800 of these being done in one day); of 16,000 in twelve days; 10,000 in four days, and 18,000 in ten days. As regards ordnance clothing, this can be disinfected, in sackfuls at a time, at the rate of many thousands of articles every two hours, tens of thousands daily, and hundreds of thousands weekly.

A most striking illustration of the advantages of this rapidity was afforded in one instance, where a van disinfector which had just disinfected a division of 18,000 troops in twelve days in one area went off about 500 miles to a center in southern Europe, where some cases of typhus had occurred among the native laborers. It disinfected the whole of the troops and laborers (1,500 in number) in three days, and was back at work again in its former area disinfecting another division on the fourth day.

In the first three months of their work two van disinfectors carried out the disinfection of 170,000 kits, 170,000 overcoats, 340,000 blankets and great masses of ordnance clothing. Since that time the disinfectors in use have been the most prominent and effective measure of preventive work in Egypt, each double van disinfector being capable of carrying out in the simplest and most efficient way in all parts of the war area—up to railhead—disinfection of troops and native laborers to the number of 60,000 men monthly. The total number of disinfections carried out in twelve months (May, 1916, to April, 1917) among a monthly average of 40,000 laborers was 495,000—an average of over 40,000 a month.

26. **Use of Scapula in Thoracoplasty.**—The bone of the scapular body is utilized by Adams to take the place of resected ribs, and its muscles to secure mobilization of the lung and raising of the diaphragm, both essential factors in the healing of these cases.

27. **Treatment of Septic Gunshot Wounds of Knee Joint.**—In the earliest stage of infective traumatic arthritis, Neve says, an attempt should be made by tapping and distending the joint with some antiseptic, such as flavine or iodoform emulsion, to abort the sepsis. This is being successfully done in France. Good fixation of the limb is essential. When sepsis is established thorough drainage is essential; anterior lateral incisions do not suffice; the Peck method is not successful. Suprapatellar, anterolateral, and posterolateral incisions should be used in combination. If there is bone damage excision is desirable in most cases, and the bone surfaces may be kept apart.

Carrel's method offers the only effective way of introducing an antiseptic fluid into the recesses of the injured joint.

With other methods burrowing pus very frequently occurs, with abscesses tracking up and down the limb and septic absorption; and amputation is apt to be performed too late, when the vital powers have succumbed to the prolonged strain and sepsis has become generalized with a perhaps fatal result.

Medical Journal of Australia, Sydney

Aug. 24, 1918, **2**, No. 8

32 Prevention of Disease. F. S. Hone.—p. 153.
33 City Milk Supply: Plea for Pasteurization. E. B. Heffernan. —p. 157.

Medical Journal of Siamese Red Cross, Bangkok, Siam

April, 1918, **1**, No. 1

34 Treatment of Trachoma by Carbonic Snow. H. C. Highet.—p. 16.
35 Treatment of Eight Cases of Concussion Aphasia by General Anesthesia. H. S. Bholaraksha.—p. 29.
36 Severe General Pruritus as a Prodromal Symptom of Human Rabies. L. Robert.—p. 34.
37 Spirochetal Infection of Ulcers. R. W. Mendelson.—p. 43.

Practitioner, London

September, 1918, **101**, No. 3

38 Headaches of Sinus Origin. W. Ibbotson.—p. 121.
39 Recent Public Health Work. J. Priestley.—p. 128.
40 Recent Work on Diseases of Lungs. A. J. Jex-Blake.—p. 135.
41 Tuberculosis Problem. E. Ward.—p. 141.
42 Exercise, Work, Rest and Sleep; Comparison of Sayings in Regard to Their Hygienic and Physical Value, etc. F. P. Weber. —p. 146.
43 *Surgical Treatment of Intussusception. W. H. C. Romanis.—p. 152.
44 Series of Severe Cases of Osteomyelitis. R. A. Walker.—p. 163.
45 *Treatment of Hemophilia. J. D. R. Monro.—p. 167.
46 Large Retropharyngeal Swelling Due to Aneurysm of the External Carotid Artery. G. W. Thomas.—p. 169.
47 Allen Treatment of Diabetes Modified by Administration of Alkalies in Full Doses. T. E. Mulvany.—p. 171.

43. **Surgical Treatment of Intussusception.**—Three hundred and seventy-four cases of intussusception treated by laparotomy at St. Thomas' Hospital during the twenty years from 1898 to 1917, inclusive, are analyzed by Romanis. The total mortality was 121, or 32.3 per cent.; but since 1898 the mortality percentage has been lowered from 48.1 per cent. for the four year period, 1898 to 1902, to 19.2 per cent. for the period 1913 to 1917. There has been a more or less continuous increase in the number of patients operated on, but a steady drop in the mortality; the lowest annual mortality of the series recorded in any year being in 1915, when twenty patients were operated on, with a mortality of 10 per cent. This lowering of the death rate is due to the fact that patients have on the average come to operation earlier; many minor alterations in the technic of abdominal surgery have been, and are still being introduced from time to time.

With regard to intussusception operations in particular, it is only during the last ten years or so that surgeons have come fully to recognize the importance of the time-factor in the case of abdominal sections performed on infants and tiny children, and to realize that every minute saved during the operation of opening the abdomen of a small child increases the chances of its recovery. The harmful effects of general anesthesia in infants has been taken into account, and every effort made either to reduce its duration to a minimum in various ways or better, to substitute spinal anesthesia in its place. It is, therefore, to these three factors, Romanis says, that we must look as offering the most probable explanation of the decided improvement in the results of surgical treatment in these cases, rather than to any supposed diminution in the time that elapses before operation is undertaken.

The different operations performed in this series were as follows: (1) laparotomy and reduction in 301 cases with mortality 26 per cent.; (2) laparotomy, reduction and appendicectomy in thirty cases with mortality 40 per cent.; (3) laparotomy, resection and union in thirty cases with mortality 63.3 per cent.; (4) laparotomy, resection and artificial anus in ten cases with mortality 100 per cent.; (5) laparotomy and lateral anastomosis above and below the tumor in three cases with mortality 33.3 per cent. This bears out the well known fact that if anything more than the simple procedure of opening the abdomen and reducing the invagination is required, the mortality rises by leaps and bounds; but it also shows that irreducible or gangrenous intussusceptions that require anything more severe than simple reduction are, fortunately, comparatively rare, only forty cases of the above series failing to be reduced. In other words, 89.2 per cent. of all cases can be reduced on opening the abdomen.

The important question whether an intussusception will be reducible or not depends almost entirely on the interval that has elapsed between the onset of symptoms and the performance of laparotomy. Of the above cases, in only one case in which operation was performed within twenty-four hours of the onset of symptoms was a resection necessary; of the cases dealt with between twenty-four and twenty-six hours after onset, only two required resection, and of those in which the interval was between thirty-six and forty-eight hours four were irreducible. All the other patients in whom an enterectomy was found necessary had been ill for over forty-eight hours before operation was performed. In dealing, therefore, with an intussusception in which symptoms have been present for less than thirty-six hours, one can feel fairly confident that reduction will be possible.

45. **Treatment of Hemophilia with Emetin.**—Monro records the remarkable result of using emetin in checking the bleeding on one occasion in a case cited. Monro gave one-half grain of emetin hydrochlorid by hypodermic injection in the forearm. The next morning the patient was in a profuse perspiration; he complained of pains in his joints, and his arm was swollen. The urine was scanty and still bloody; the temperature had fallen to 100. The day following his temperature was normal, the joints were better, and he passed normally colored urine—the first for exactly ten weeks. From that time on the patient made a steady recovery.

Bulletin de l'Académie de Médecine, Paris

August 6, 1918, **80**, No. 31

48 *Projectiles in Heart Cavities. R. Le Fort.—p. 147.
49 Lead Poisoning from Crystal Nursing Bottle. Guerbet.—p. 149.
50 *Aviator's Heart. G. Etienne and Lamy.—p. 151.
51 Influenza in Switzerland. J. Renault.—p. 153.

48. **Projectile in Left Ventricle.**—Le Fort demonstrated before the Académie the first case in France in which a scrap of shell (8 by 4 by 4 mm.) was successfully removed from the cavity of the left ventricle. He has previously reported the successful extraction of a projectile from the cavity of the left auricle. This makes the eleventh projectile he has extracted from the heart in a total of nine cases. One of the men succumbed the fourth day thereafter but all the others recovered.

50. **Aviator's Heart.**—Etienne and Lamy report that in the large numbers of aviators they have examined, the left ventricle was found constantly hypertrophied. This hypertrophy was more marked among the aviators doing bombing, etc., that require high flights. It was always moderate and well tolerated, and occurred indiscriminately in those who had or had not been trained in athletics before.

Bulletins de la Société Méd. des Hôpitaux, Paris

June 7, 1918, **42**, No. 20

52 Case of Lethargic Encephalitis at Alger. Ardin-Delteil.—p. 577.
53 Hemorrhagic Spirillosis. Beau, Dide and Ribereau.—p. 582.
54 *Intravenous Arsenic Medication. Sicard and H. Roger.—p. 585.
55 *Walled-Off Meningitis. A. de Verbizier.—p. 586.
56 Meningitis in an Epileptic. A. de Verbizier.—p. 589.
57 Simulation of Mumps. F. Trémolières and L. Caussade.—p. 591.
58 Local Eosinophilia in Dermatitis. Maccia and Petzetakis.—p. 594.

54. **Intensive Treatment of General Paresis.**—Sicard and Roger have been treating general paresis with intravenous injections of an arsphenamin preparation in large doses. In their twelve cases there never was any aggravation of the physical or mental condition. When intoxication from the medication was impending, this was revealed by blistering when the skin was painted with tincture of iodin. Another sign revealing intoxication before it became otherwise apparent was the abolition of the Achilles tendon reflex. This occurred in five of the cases during the second or third month of the intravenous treatment, to a total of 12 or 16 gm. of the drug. There was evidently incipient arsenic neuritis.

55. **Walled-Off Meningitis.**—In the three cases reported, the meningococci disappeared from the spinal fluid although the meningitic symptoms persisted. Then suddenly, after an interval of three or six days, they appeared anew in the lumbar puncture fluid. They did not disappear definitely until after fourteen intraspinal and one intraventricular injection of the serum.

Nourrisson, Paris

September, 1918, **6**, No. 5

59 *Protection of Young Infants. A. B. Marfan.—p. 257.
60 History of Care of Foundlings. R. Flament.—p. 285.
61 Early Vaccination of Infants. R. Wurtz.—p. 294.
62 Extraventricular Hydrocephalus. A. B. Marfan.—p. 297.

59. **Protection of Young Infants.**—Marfan reviews the history of the movements for protection of young infants from ancient Rome to modern times. In conclusion he urges the establishment in crowded parts of the city of an institution where mothers can leave their children during the day in competent hands, with a free restaurant for nursing mothers, a working home for nursing mothers who have no one to support them, a hospital for infants requiring institutional care, and a kitchen for providing food for infants and children, sick or well, and an affiliated dairy and a convalescent home for infants in the country. An institution of this kind would render priceless services to the mothers and medical students as well as to the infants, and through them later to the state. Marfan emphasizes the necessity for all this social service being on the highest plane of efficiency, with a numerous personnel.

Paris Médical

Aug. 10, 1918, **8**, No. 32

63 *Tuberculous Pelvic Peritonitis in Men. J. Duvergey.—p. 117.
64 Passive Mechanotherapy for Sequels of War Wounds. Guilleminot, Cistrier and Baudouin.—p. 120.
65 *Persisting Bone Fistulas. R. Bonneau.—p. 124.
66 *Albumin in Hemorrhagic Cerebrospinal Fluid. L. Boyer.—p. 129.

63. **Tuberculous Pelvic Peritonitis in Young Men.**—Duvergey has encountered several cases of chronic partial occlusion of the bowel in soldiers, with enlargement of the abdomen, febrile periods and loss of flesh. Ordinary palpation of the abdomen gives negative findings. Palpation through the rectum reveals an encysted accumulation of fluid and false membranes filling the small pelvis more or less completely. The compression from the ascitic fluid interferes with bowel and bladder functioning. He cleared out the pelvis through a subumbilical laparotomy, leaving a drain for five or six days. The seven men thus treated seem to be cured completely; the interval since has been two years in some. He warns not to attempt to operate through the rectum on the tumefaction palpated there—the peritonitis should be given the benefit of the laparotomy. This pelviperitonitis is an essentially local and surgical form of tuberculosis.

65. **Treatment of Fistulas.**—Bonneau has charge of a hospital that specializes in treatment of fistulas, and he declares that thorough surgical clearing out of the fistula may be counted on for a cure. In the type of persisting bone fistula leading into a central cavity, with rigid walls, the surgical treatment has always hitherto been inadequate. It is not realized that this central cavity may be irregular in shape, with diverticula or passages reaching for 6, 8 or even 10 cm. The whole cavity, the fistula, itself, and the soft parts around, he says, "are drowned in sclerosis," and the anatomic conditions offer no opportunity for healing and repair even if the cavity is sterilized. The central cavity must be opened up to transform it more into a flat surface; after resection of the rigid tissues, mobilize the normal tissues, muscles, cellular tissue and fat, bringing them as much as possible over the plane surface provided by cutting away a long oval of bone and tissue to expose the central cavity. A head mirror is indispensable, and a strong jet of hot water is useful for washing the cavity clean. There is liable to be considerable hemorrhage unless ample precautions are taken. It may be necessary to sacrifice formidable amounts of sound bone, but this is the price of success. In some cases he had to slice the bone like a sausage over a long segment before sound tissue was reached. The greater the experience, the more generous in sacrificing the bone. The clearing out must be as scrupulously careful as at a mastoid operation. It is sometimes necessary to open up the cavity from the side opposite the fistula, to avoid injuring nerves or vessels, or when the cavity is closer to the surface on that side. It is around this type of fistula, he remarks, that all fistula surgery gravitates. Anything short of absolute thoroughness is bound to fail. He has thus cured men whose fistula had been curetted fourteen times, without curing the lesion, and finally some constitutional disease had been incriminated. Surgeons who practice this thorough *évidement* are unanimous in the optimism of their prognosis, even for fistulas that have been suppurating for two or three years.

66. **Albumin in Cerebrospinal Fluid.**—Boyer refers to hemorrhagic fluid, and says that the proportion of albumin can be estimated by centrifuging and determining the albumin content in the decanted fluid. This removes the red corpuscles. Normal blood averages 5,000,000 or 5,500,000 reds, with about 80 per cent. albumins. The average albumin content of a liter of normal blood, multiplied by the amount of plasma in the specimen of spinal fluid being examined, gives approximately the quantity of soluble proteins from the blood. If 50,000 reds are found in the specimen, then the fraction $\frac{5{,}000{,}000}{50{,}000} = 0.01$ represents the amount of blood in the specimen, and half this, the amount of the plasma present. The albumin in the spinal fluid is thus what is left after subtracting the figure resulting from multiplying 75 or 80 by $\frac{\text{Number of reds}}{5{,}000{,}000 \times 2}$. Of course this method can be applied only with sound reds.

Presse Médicale, Paris

Aug. 15, 1918, **26**, No. 46

67 *Oliguria of Cardiac Origin. O. Josué and M. Parturier.—p. 421.
68 Identification of Meningococcus in Carriers. P. Papin and H. Stévenin.—p. 423.
69 *Test for Blood. Thévenon and Rolland.—p. 425.

67. **Oliguria of Cardiac Origin.**—Josué and Parturier discuss the clinical consequences of oliguria of cardiac origin, especially the retention of nitrogenous waste and retention of water, the latter entailing hydremia and visceral and interstitial edema. The urine with asystole is scanty, rich in urea, but with little chlorids as the latter are retained to make the retained water isotonic. The urea content of the blood is so high from the oliguria alone that it may suggest pathologic conditions in the kidneys when in fact they are still sound. If the heart recuperates and regains its force, the diuresis returns to normal, and the urea content of the blood drops to normal. Treatment should be addressed to the heart. On account of the oliguria, all the symptoms are deceptive, all the laboratory findings misleading. The first task is to get the heart to pumping normally and induce the liberating diuresis. Digitalis and theobromin are useful whether or not the kidneys are pathologic, supplemented possibly by restricting the intake of salt. When the blood is pumped through the vessels with the normal force, there need be no restrictions as to intake of salt in these cases.

69. **Test for Blood in Excreta and Effusions.**—The test described is based on the color reaction given by pyramidon in the presence of an oxidizer. The reagents are (1) a solution of 2.5 gm. pyramidon in 50 c.c. of alcohol (90 degrees), and (2) a solution of 1 c.c. of crystallizable acetic acid in 2 c.c. of distilled water. To 3 or 4 c.c. of unfiltered urine, for example, is added the same volume of the pyramidon solution, and 6 or 8 drops of the acetic acid solution. After agitation, 5 or 6 drops of hydrogen peroxid solution (12 volumes) are added, and the fluid turns at once an intense violet if there is much blood present. The reaction is slower in developing if there is not much blood, reaching its height in fifteen minutes and then retrogressing. The same technic can be applied to fecal matter; a small amount is triturated with 3 or 4 c.c. of distilled water; after decanting, the reagents are applied as above, as also in examination of gastric juice, spinal fluid, pleural effusion, etc. All the tests

made with this technic were controlled with the Meyer phenolphthalein test, and the findings were constantly parallel. The test is therefore as sensitive as the latter, while the technic is simpler and the reagents more durable.

Progrès Médical, Paris

July 13, 1918, **33**, No. 28

70 *General Paresis. H. Damaye.—p. 237.
71 Primary Suture and Early Evacuation. Aimes and Sari.—p. 240.

July 20, 1918, **33**, No. 29

72 *Complications of Vincent's Angina. L. Tixier and Tobé.—p. 245.
73 Cyclic Albuminuria of Malarial Origin. C. Garin.—p. 249.

July 27, 1918, **33**, No. 30

74 *Extraction of Projectiles under Screen Control. Civel.—p. 255.

70. **General Paresis in an Army Psychiatric Center.**—Damaye has encountered in two years 32 cases of general paresis at the center in his charge. There was albuminuria in 11, plus heart disease in 8. In 4 cases shell concussion had brought it on; in 2 other cases a fall or kick by a horse. A number of cases are described in detail; all show the marked improvement that may be realized in the early stages by repose of mind and body, with tonics and mercury later, when the tonics have increased the resisting powers. He insists that dismissal from the military service is imperative, but that the man should be kept for thorough treatment and the family instructed how to continue it at need.

72. **Complications of Vincent's Angina.**—The fusiform bacillus-spirochete infection of mouth and throat may induce eruptions of various kinds, swelling and ulceration in glands in the neck and elsewhere, and all kinds of other septicemic complications, from bronchitis, albuminuria, pericarditis and iritis to congestions in various serous membranes and even pneumonia. Examples of these different types of septicemic complications of Vincent's angina have passed through the hands of Tixier and Tobé. In many instances the complications so outshadowed the "trench mouth" that the connection with the latter had not been suspected. In some cases the ulcerating fusiform-spirochete infection had been overlooked. Treatment has to be local and vigorous, clearing out the ulcerating gums and throat with a 1 per cent. solution of methylene blue or silver nitrate or a weak solution of some arsphenamin preparation. (For treatment see further Campbell and Dyas, THE JOURNAL, June 2, 1917, p. 1596.)

74. **Extraction of Projectiles Under Screen Control.**—Civel tells about his work in this line since his first publications on the subject in 1904. By 1916 he had a record of 132 cases in which needles or pins had been extracted by this method and twenty-four foreign bodies in the esophagus, besides many cases of war projectiles. With the screen control it is not necessary to make an incision any larger than is required to admit the instrument for extraction of the foreign body, so that the buttonhole incision under screen control is the main feature of his technic. He claims priority not only for the method but for its application to war projectiles.

Revue Médicale de la Suisse Romande, Geneva

August, 1918, **38**, No. 8

75 *Pernicious Anemia in Young Infants. A. D'Espine.—p. 461.
76 Chronic Amebic Dysentery. F. Wanner.—p. 471.
77 *The Cerebrospinal Fluid with General Paresis. I. Osman.—p. 477.
78 Cure of Gonococcus Hydrarthrosis of Knee under Intravenous Injection of Colloidal Sulphur. C. G. Cumston.—p. 483.
79 *Fat Embolism. T. Nakata.—p. 486.
80 Psychosis in Scarlet Fever in Adult. A. Schlesinger.—p. 489.

75. **Pernicious Anemia in Young Infants.**—D'Espine discusses 2 cases of pernicious anemia in infants of 11 and 5 months from private practice. He has previously published 2 personal cases, and a recent compilation lists 56 cases from the literature. This latter group includes 32 cases in which the anemia was traceable to the bothriocephalus or a tenia. Only 2 cases are known of essential progressive pernicious anemia in older children: A girl of 6 died in six weeks after the first symptoms of the hemorrhagic pernicious anemia, and a boy presented simple anemia for several years. It assumed the pernicious type at the age of 13, and he died two years later. There is no verified case on record of pernicious anemia in young infants, and in the 2 cases reported the infants recovered. In the first case a one-sided diet was incriminated, the pernicious anemia being regarded as, to some extent, an equivalent for scurvy. The other child was breast fed. The clinical picture was that of true pernicious anemia in each case except that there was no leukopenia. The recoveries are ascribed to the special serotherapy used. The serum was obtained by venesection of animals at the height of the regeneration of blood following a previous extensive withdrawal of blood. This "hematopoietic serum" seems to have a decidedly favorable action on the composition of the blood, when injected in cases of pernicious anemia. These infants were given daily subcutaneous injections of 5 or 10 c.c. of the serum. It is the result of the researches of Prof. P. Carnot, mentioned in THE JOURNAL, at different times. The changes in the blood count, from hemoglobin 20 per cent. and reds 658,875, to 53 per cent. and 2,102,125 reds in nine months, testify to the efficacy of this form of serotherapy. In the first case the hemoglobin rose from 25 to 75 per cent. in a month.

77. **The Spinal Fluid in General Paresis.**—Osman states that in forty cases of general paresis he found large numbers of cells and usually a high albumin content in the cerebrospinal fluid early in the disease. As the disease progresses, the number of cells grows less.

79. **Fat Embolism.**—Nakata injected olive oil or emulsions of human fat into an artery or vein of rabbits, guinea-pigs and frogs. Comparing the resulting phenomena with his clinical experiences in seven cases of fat embolism, shows that fat embolism does not occur in the general circulation in man, or only to a minimal extent. The fat never accumulates in the greater circulation and it rapidly disappears from the blood. In the pulmonary circulation, on the other hand, the presence of fat in the lung vessels was manifest up to eighteen days. Part of the fat injected into an artery or vein accumulated in the pulmonary vessels and lingered there, but the largest proportion of the fat piled up in the liver. The local force of the general blood stream aids in sweeping the fat along.

Correspondenz-Blatt für Schweizer Aerzte, Basel

Sept. 7, 1918, **48**, No. 36

81 *Rupture of Aorta with Chronic Nephritis. W. Löffler.—p. 1185.
82 *Tardy Intracranial Hemorrhage. V. Demole.—p. 1191.
83 Alveolar Pyorrhea. M. Hausmann.—p. 1197.
84 *Dermographism of the Thorax with Tuberculosis. G. Ichok.—p. 1201.
85 *Significance of Lactic Acid in Stomach. A. Rodella.—p. 1210.

Aug. 24, 1918, **48**, No. 34

86 *Necropsy Findings in Influenza. A. Glaus and Fritzsche.—p. 1121.
87 Powder Treatment of Nose in Prophylaxis of Influenza. A. Schönemann.—p. 1125.
88 *The Appendix and Gynecologic Disease. C. Waegeli.—p. 1127.
89 *Symphysiotomy. Y. de Reynier.—p. 1136.
90 *Dinitrobenzene Poisoning. O. Steiner.—p. 1139.

81. **Rupture of Aorta with Chronic Nephritis.**—Löffler reports two cases in a woman of 38 and a man of 43, the spontaneous rupture occurring during sleep in the latter. The heart was much hypertrophied in both cases. The wall at the point of the rupture was not particularly thin. In the woman it spared the outer coat of the artery and did not induce any symptoms. There are a few such cases on record in which the incomplete rupture healed and proved a necropsy surprise.

82. **Tardy Intracranial Hemorrhage.**—In a fall on the stairs the right occipital bone was fractured, but except for vague headache and weakness the woman of 49 showed no symptoms from the contusion for twenty days. Then slight mental confusion, inattention and forgetfulness attracted attention for a few days, then came delirium and stupor, with right lax hemiplegia and left spastic hemiparesis. Necropsy revealed a large hematoma under the intact dura. It covered parts of the parietal, temporal and frontal lobes—evidently the result of progressive hemorrhage from a small branch of the median meningeal artery, the result of the impact on the other side of the skull at the contusion. The case teaches the necessity for exploratory trephining on both sides. In a recent compilation, five of the twelve patients would undoubtedly have been saved if the opposite side had been trephined when the first trephine gave negative findings.

84. **Dermographism of the Thorax with Pulmonary Tuberculosis.**—In testing ninety-six tuberculous men, Ichok found a positive reaction in 68.9 per cent. of the chronic cases, and only in 5.9 per cent. with more recent infection. In thirty cases of recent pleurisy, a positive reaction was elicited in only one. These findings and his analysis of the literature seem to indicate that the dermographic reaction is an indirect index of the behavior of the musculature, as he explains in detail.

85. **Relations Between Lactic Acid and Hydrochloric Acid in the Stomach.**—Rodella's further research has demonstrated that sterile substances covered with pure concentrated hydrochloric acid, if they are not destroyed, remain sterile. But much infected albuminous substances, in solid form and in not too small fragments, covered with hydrochloric acid, not only fail to become sterile but at body temperature strong fermentation occurs. The products of this fermentation may include lactic acid. This responds positively to the Uffelmann test even in the presence of hydrochloric acid. Neither the lack of hydrochloric acid nor the presence of a tumor and its resulting stagnation are absolutely necessary for the production of lactic acid. It can occur wherever there is retention of stomach content, plus the presence of some substances which bind the hydrochloric acid or which protect the fermentable matter against the action of the hydrochloric acid. When these conditions are realized, lactic acid may be formed abundantly in the stomach even without cancer. Prou reported in 1917 that he had found lactic acid in the fasting stomach in 27 per cent. of 300 cases of nonmalignant stomach disease. He declared that the significance of lactic acid needed revision. Rodella will discuss in a following article the relations between secretion of hydrochloric acid and the production of lactic acid as studied from the clinical and from the bacteriologic standpoints.

86. **Necropsy Findings with "Spanish Influenza."**—Only fifteen were females in the fifty-three fatal cases with necropsy, and in all but thirteen cases the patients were absolutely healthy young people between 19 and 30. The oldest was 59, the youngest a year old child. The women were nearly all pregnant or had heart disease. The fatal complications of the influenza are due to mixed infection with pneumococci, streptococci and staphylococci. No influenza bacilli were found at necropsy, even in cases in which they had been cultivated during life from the sputum and sometimes from the blood.

88. **Relations Between Gynecologic Disease and the Appendix.**—On the basis of 896 laparotomies for gynecologic disease, Waegeli concludes that concomitant appendix disease, found in 16.4 per cent., was secondary to the gynecologic lesion in most of the cases. Lesions were found in the appendix in 75 per cent. of the cases of torsion of a cyst in the right ovary, and in 23.7 per cent. of the cases of right tube or ovary disease, but never with left tube or ovary disease alone. Simple congestion in the appendix with gynecologic disease he warns is not enough ground alone for appendicectomy. On the other hand, he urges systematic investigation of the right tubes and ovaries as a routine measure in all cases of appendicitis. This may reveal its secondary character.

89. **Symphysiotomy.**—Reynier analyzes thirteen cases in which symphysiotomy was done, in nearly all as an emergency measure. It does not seem to be any more serious than a forceps intervention. In two of the cases described in detail the symphysiotomy was done under local anesthesia, and it proved to be speedy and free from complications, allowing the birth of a well developed vigorous child. The local anesthesia rendered the symphysiotomy painless, and the labor pains at the following spontaneous delivery were no greater than at any moderately difficult delivery. The fetus at two preceding pregnancies had been removed by perforation or had died soon after induced premature delivery. The true conjugate was 8.5 and 9 cm. but the pelvis was generally contracted. Symphysiotomy was decided on, and the women allowed to go to term, and the results fulfilled all anticipations.

90. **Dinitrobenzene Poisoning.**—Steiner describes seven cases in munitions workers, and comments on the gray discoloration of the mucous membranes and sometimes of the whole skin. The blood looks gray and thick, but the differential count is normal except that there is excessive destruction of reds. In treatment he found useful inhalation of oxygen, free withdrawal of blood followed by infusion of sodium bicarbonate, with stimulants, and copious drinking of milk. The clothes must be removed from the room, and the whole body, especially the hands and hair, must be thoroughly washed with hot water and soap.

Annali di Ostetricia e Ginecologia, Milan

June, 1917, **19**, No. 6

91 Treatment of Tuberculous Peritonitis in Women. C. Merletti.—p. 201.

July, 1917, **19**, No. 7

92 *Temporary Tubal Sterilization. E. Alfieri.—p. 213.

92. **Operation on Fallopian Tube.**—Alfieri ligates the tube, cuts off the fimbriated end, and pushes the ligated stump into a blind tunnel bored for it in the posterior wall of the uterus, where it is held with two stitches. The procedure is repeated with the other tube, and conception is thus rendered impossible. When the need for preventing conception has passed, the ends of the tubes can be released, and practically normal conditions thus be restored once more. His article is illustrated.

Pediatria, Naples

September, 1918, **26**, No. 9

93 *Malignant Lymphogranuloma. R. Jemma.—p. 513.
94 *Vaccine Therapy of Diplococcus Infections. R. Pastore.—p. 524.
95 Recovery from Tetanus under Serotherapy. Marinucci.—p. 536.

93. **Malignant Lymphogranuloma.**—In both of Jemma's two cases the children of 6 and 11 presented signs of inherited syphilis, and in one the tuberculin test was positive.

94. **Vaccine Therapy of Pneumococcus Infection.**—Pastore applied diplococcus vaccine in eight cases of protracted pneumococcus infectious processes, pyothorax, interstitial pneumonia or migratory pneumonia. Acute pneumonia runs too brief a course for vaccine therapy to display much efficacy, but in these practically chronic cases the pneumococcus lesions in the pleura or the parenchyma of the lung were favorably influenced by this systematic intravenous vaccine therapy. The results were particularly striking in purulent pleurisy. The vaccine seemed to arrest the process and it retrogressed, obviating the necessity for operative measures and even puncture. The little patients were 18 months, 2 and 4, to 9 years old. There was usually a vigorous reaction to the first injection, with a chill, dyspnea and cyanosis but the following injections seldom elicited any appreciable reaction. In others the reaction appeared with the second or third injection, but there were no mishaps of any kind. The vaccine was a suspension of a twenty-four hour culture of Fränkel's diplococcus on a hemoglobinized culture medium. The bacilli were estimated by the opacity of the fluid, and from 0.10 to 0.20 c.c. was used containing from 10,000 to 20,000 of the microbes. Up to eleven injections were made in some of the children.

Policlinico, Rome

July 21, 1918, **25**, No. 29

96 *War Surgery. M. Fasano.—p. 677. Concluded in No. 30, p. 701.
97 *Premature Grey Hair and War Psychopathies. C. Vignolo-Lutati.—p. 680.

July 28, 1918, **25**, No. 30

98 Epidermis Grafts. F. Costa.—p. 707.
99 Apparatus to Facilitate Plaster Treatment of Fractured Leg. E. Cavazzani.—p. 708.
100 Tests of Liver Functioning. G. Sabatini.—p. 709.

96. **War Wounds of Elbow and Knee.**—Fasani describes how his extra conservative management of wounds of the elbow during the first years of the war gave such poor results, both in the stiff joints left and the tedious septic complications, that he finally decided to operate at once in the more serious cases. The results were surprising, the pains and fever subsiding under a light aseptic dressing, and passive movements being begun by the fifth to the eighth day. They

can be done by the man himself, and he soon appreciates the benefit from them. Fasani obtained far better results with wounds of the knee when he restricted intervention to a median longitudinal incision, extending it upward or downward as circumstances indicated. The incision is carried through the patella, dividing it in half, and thus affording ample access to the joint without permanent impairment of its functioning. The simplicity of this technic and its great practical usefulness commend it as the best mode of access to thoroughly explore the joint. When resection is inevitable in a septic focus, he cauterizes profoundly the raw surface to make a barrier between the sound tissue and the septic field in which it lies. By the time the eschar drops off, a layer of granulations keeps up the defensive barrier. He also makes a point of refraining from coaptating the resected stumps, but keeps them apart to ensure better draining and permit medication until the septic process has died out.

A wounded artery should be sutured when possible, but a ligature does not inevitably entail gangrene. Fractioned and consecutive ligation may be permissible sometimes. In one case of a traumatic false aneurysm of the femoral artery, there was tardy hemorrhage on several occasions, and he ligated in turn the femoral and the external iliac at different heights. As the hemorrhages kept recurring, he made a transfusion of blood from the man's 17-year-old brother, and this arrested the tendency to hemorrhages and the man soon recovered. The benefit in this case suggests transfusion as a routine procedure with hemorrhages from pseudo-aneurysms.

97. **Premature Blanching of the Hair.**—Lutati relates that the hair of an artillery captain of 24 turned almost completely white during the two days of the battle on the Piave. A young lieutenant had barely escaped being taken prisoner by the enemy and part of the hair on one side turned white in the course of a day or two. In another case a railroad man of 38, after a bombardment of his train, had all his hair, brows and beard drop out. As they grew again, they came in white, but by the end of eight months the eyebrows and beard had returned to the former chestnut color but the scalp hair was still white. Another soldier noticed a long patch of white hairs on the side of his head the morning after a battle. This white strip was still plain eight months later, when Lutati first saw it. He has witnessed further the premature progressive blanching of the hair in several aviators, and this is not uncommon in men who have spent some months at the advanced front. He regards it as an indication of nervous instability, liable to make trouble later. In connection with these cases personally observed, he cites a number of the classic instances on record.

Riforma Medica, Naples

August 10, 1918, **34**, No. 32

101 *Atrophy of Tumors under Restricted Diet. E. Centanni.—p. 626.
102 Successful Resection of Large Arteriovenous Aneurysm of Popliteal Artery. G. Matera.—p. 631.
103 Present Status of Bone Grafting. E. Aievoli.—p. 635.
104 Vocational Training of Disabled Soldiers. E. Levi.—p. 639.
105 Antituberculosis Campaign of Italian Red Cross. A. Botti.—p. 643.

101. **Dietetic Treatment of Cancer.**—Centanni does not hesitate to call his experiments here reported "the most important results accomplished to date in modern cancer research." The idea of dietetic treatment of malignant disease is not new, but hitherto the experiments have been made with a diet which starved all the cells. The consequence was that the normal cells were too weak to contend with the cancer cells, and the malignant disease was merely whipped up by the modified diet. Centanni, on the other hand, sought to modify the diet in such a way that it amply sufficed for the nourishment of all the cells, cancer cells included, but the substances in the diet which promote growth were all carefully excluded, and others added which tend to inhibit growth. Modern research has demonstrated a number of food substances which promote growth—he calls them blastins—and he emphasizes that cancer cells do not differ essentially from normal cells except in their "tumultuous multiplication." By depriving them of those elements in the food the fundamental office of which is to sustain the multiplicative function, auxetics, *Wuchsstoffe* or blastins, and for which the cancer cells display exceptional avidity, the tumor cells languish and die. Among the facts which testify to the correctness of this assumption are Haaland's experiences—confirmed by others—to the effect that gestation prevents successful grafting of tumors and checks the growth of those already implanted. The physiologic growth of the fetus victoriously combats the pathologic growth of the cancer.

In Centanni's research he experimented with ninety-three series of from four to ten mice each. On ordinary food, 100 per cent. of the tumor grafts "took" and some grew to be larger than the body of the mouse to start with. Given the restricted diet ten days beforehand, none of the grafts "took" or only feebly grew. On this diet, tumors already established, up to 2 or 2.5 cm. in diameter, became arrested and were finally reabsorbed without leaving a trace. Large tumors softened and decayed to a friable mass. The most striking results were obtained when the main mass of the tumor was resected and the remainder became reabsorbed as the animals were kept on the blastin-free diet. The growth promoting substances are certain vitamins, certain internal secretions and certain chemical substances. In his experimental diet he took particular pains to exclude the antiscurvy vitamin and nuclein and phosphorus compounds, and denatured the food by heating to 125 or 130 C. The outlook for application of the principle to man is promising, as human beings are particularly sensitive to lack of vitamins, while the size of the cancer in proportion to the whole body is immeasurably smaller than in the experiments related. On the other hand, the results will take much longer to become manifest. The method is harmless, as any disturbances from a dietetic deficiency would be recognized early and could be promptly remedied. Experienced medical supervision would be indispensable.

Tumori, Rome

June-August, 1918, **6**, No. 2

106 *Experimental Glio-Fibro-Endotheliomas. D. B. Roncali.—p. 73. To be continued.
107 *Primary Perithelioma of Ethmoidal Mucosa. G. Basile.—p. 115.
108 *Tissue Growth and Tumor Growth. L. Loeb.—p. 127.

106. **Experimental Endotheliomas.** — Roncali's extensive experimental research with inoculation of the toxic products and the endotoxins of pathogenic blastomycetes has apparently demonstrated that no cells are affected by them except those which are in a specially receptive state, that is, candidates for anaplasia. And among these, only those which have undergone some traumatism at the moment of the injection, and when the antigen has come in direct contact with them. These facts were confirmed by injection into the brain of twelve dogs. Two of the dogs died with symptoms of a focal brain lesion the twenty-fourth and thirtieth day after the injection, and a neoplasm was found at the spot consisting of gliomatous, endothelial and connective tissue, evidently malignant. The article is to be continued.

107. **Primary Perithelioma.**—The pedunculated tumor in the nasal fossa had developed from the perivascular endothelium, the so-called perithelium. It had followed a few months after removal of supposed polyps.

108. **Tissue Growth and Tumor Growth.**—This is a translation of Loeb's article in the *Journal of Cancer Research*, summarized in THE JOURNAL, June 9, 1917, p. 1781.

Gaceta de los Hospitales, Mexico, D. F.

June, 1918, **1**, No. 3

109 The Mental State in Hysteria. J. T. Rojas.—p. 33. Conc'n.
110 *Immovable Retroversion of the Uterus. R. R. Ojeda.—p. 41. Conclusion.
111 *Autoserotherapy in Ascites. A. Maya.—p. 57.

110. **Vaginal Operation for Retroversion of the Uterus.**—Ojeda describes with eighteen illustrations the various steps for correction through the vagina of immovable retroversion, and gives a brief summary of twenty-six cases in which this colpoperineorrhaphy was successfully applied.

111. **Autoserotherapy in Ascites.**—Maya has only two cases to report, but the influence from the autoserotherapy was prompt and pronounced. The effect seems to be mainly on the diuresis. In both the women the accumulations of fluid seemed to be passed off in this way. The procedure is harm-

less and is certainly worth a trial, he says, in cases of ascites with still sound kidneys. The ascitic fluid obtained by puncture is reinjected into the cellular tissue, without withdrawing the needle. He injected from 2 to 6 c.c. in this way at three or four day intervals, a total of six and thirteen injections in his two cases. The ascites was of six months' and nine years' standing. The first case was in a woman of 60. There has been no return of the ascites during the seven and nine months to date.

Repertorio, Bogota

August, 1918, **9**, No. 11

112 *Medical Education in Colombia. E. Ferrero and others.—p. 565.
113 *Technic for Vaccination against Typhoid. M. Mendez.—p. 585.

112. **Medical Education in Colombia.**—The addresses here given were delivered on the occasion of the inauguration of the new buildings for the medical school, mentioned in THE JOURNAL, recently, p. 1238. The speakers were the minister of public instruction, the secretary of the department of public works, and other state officials, besides the president of the medical faculty.

113. **Vaccination Against Typhoid.**—Mendez expatiates on the great value of antityphoid vaccination which has been applied in Colombia on a large scale. But he protests that it is not necessary for every one to be vaccinated, as some advise. Only those particularly exposed to the disease, such as soldiers and nurses, should be systematically vaccinated. He warns further that all persons should be excluded who have fever, albuminuria or signs of tuberculosis, syphilis or Addison's disease. Suprarenal insufficiency is a particularly important contraindication for antityphoid vaccination, as he demonstrates by the case of an army officer. Severe symptoms followed the third injection of the vaccine, keeping up into the next day: profuse sweating, rapid respiration, livid aspect, complete relaxation of the members, distress and frequent vomiting. The man was so sensitive that he winced at the gentlest movement. The pulse was absolutely imperceptible and the heart sounds scarcely to be heard. The temperature in the axilla was 41 C. and there was complete anuria. These symptoms showed no attenuation by the next day, but then epinephrin was injected and improvement became evident almost at once; by the fourth hour the pulse became perceptible. Recovery was accelerated by injection of a solution of glucose. The injections of epinephrin were kept up for a week, by which time the patient was able to leave his room. This was the only mishap encountered in the course of the vaccinations at Bogota.

Revista dos Cursos, Porto Alegre, Brazil

1918, **4**, No. 4

114 Present Status of Nuclear Ophthalmoplegia. V. de Britto.—p. 3.
115 *Surgery of the Stomach. C. Wallau.—p. 31.
116 *Drainage of Abdominal Cavity. C. Wallau.—p. 45.
117 Vaccine and Serotherapy of Gonorrhea. M. Gomes.—p. 56.
118 Tardy Inherited Phagedenic Syphilis. U. Nonohay.—p. 75.
119 Syringomyelia. G. Vianna.—p. 80.
120 Pituitary Dystrophy. F. Barros.—p. 87.
121 Prepuberal Acute Psychosis. L. Guedes.—p. 104.
122 Chagas' Disease. A. M. da Cunha.—p. 108.
123 Dental Alveolar Polyarthritis. C. Lima.—p. 124.

115-116. **Surgery of Stomach and Abdomen.**—These two articles were the last from Wallau's pen before his recent death. He reviewed his experience with thirty-two operations on the stomach, and discussed the best means for draining ascitic fluid and other collections of fluid in the abdomen. He protested against the too prevalent practice of curetting the uterus, relating instances of serious sequels, and styling it a crime *de lesa natureza*, high treason against Nature. He reiterated that Nature created the abdominal cavity a closed cavity, and that this should be respected to the utmost. In one of his cases the ascitic fluid drained into the scrotum like a hydrocele. This was readily punctured as required, relieving the patient from the tapping of the abdomen. In a second case he intentionally accomplished the same with a trocar, drain tube, and urinal. He adds that this would be the ideal method for draining the abdominal cavity if this persisting permeability of the inguinal canal was the normal condition instead of being a rare anomaly.

Revista Ibero-Americana de Ciencias Medicas, Madrid

July, 1918, **40**, No. 167

124 *Dislocations and Fractures of the Elbow. S. G. Hurtado.—p. 3.
125 *Suprarenal Form of Malaria. C. Fraga.—p. 9.
126 Inorganic Heart Murmurs. A. N. Blasco.—p. 21. Conc'n.
127 *The Diet with Cirrhosis of Liver. R. M. Terol.—p. 29.
128 Manic Depressive Insanity. A. Sanchez-Herrero.—p. 37.

124. **Dislocations and Fractures of the Elbow.**—Hurtado gives some roentgenograms of normal elbows as well as of others with fractures or luxations, showing the differences between the adult and infant elbows in both health and disease.

125. **Suprarenal Form of Malaria.**—Fraga reports from Brazil three cases of a set of symptoms indicating acute insufficiency of the suprarenals, and explained by malarial infection. One of the patients was demonstrated at a meeting of the American Society of Tropical Medicine at New York. Necropsy in one case showed the malaria parasites in the capillaries of the suprarenal cortex. The importance of this suprarenal form of malaria is enhanced by the fact that we have in epinephrin a means to tide the patient past the danger point. In the algid form, artificial serum with epinephrin given by the vein, may complete the triumph of quinin. In the less severe cases opotherapy alone may prove effectual.

127. **Diet with Cirrhosis of Liver.**—Terol advises a milk diet in the early stages of cirrhosis of liver. This leaves the liver comparatively in repose while promoting diuresis. He gives nothing but water the first day except a purge. An adult should take 3 liters of milk during the day, sipping a small amount every one or two hours. The milk should never be taken more than this at a time, as this would distend the stomach, with retention and fermentation with results injurious for the liver cells, and digestive disturbances which impel the abandoning of the milk diet. The milk must never be taken raw, but goat's or asses' milk may be substituted for cow's milk. Fermented milk or condensed milk, etc., should not be used except when the patient wearies of the sterilized milk. This milk diet should be kept up for a month. After this the ordinary diet can be very slowly and gradually resumed, keeping to small meals of easily digestible foods. He advises four meals, the two latest at 5 and 9 p. m., but they should never be abundant. Weak mineral waters are useful, avoiding all carbonated beverages as their gas distends the stomach. Mastication should be especially thorough, and the patient should give both body and mind a rest after eating. General and tonic hygiene should be enforced. In cirrhosis with hypertrophy, there is excessive functioning on the part of the liver, and the diet should aim to reduce production of toxins, being restricted to starchy foods and dry vegetables with little sugar or substances liable to putrefy. In cirrhosis with atrophy, meat should be positively prohibited to ward off production of toxins, and salt should be restricted to 6 gm. a day to guard against ascites and edema.

Mededeelingen van den Burg. Geneesk. Dienst, Batavia

1918, No. 3

129 *Sugar Content of the Blood in the Tropics and Its Importance in Acclimatization. C. D. de Langen and H. Schut.—p. 1; p. 26.
130 *Nature of Acclimatization. Id.—p. 43.
131 *Glycosuria in the Tropics and "Low Fever." Id.—p. 62.

129 to 131. **Sugar Content of the Blood and Acclimatization in the Tropics.**—The extensive researches of de Langen and Schut at Java have demonstrated that in both man and animals the sugar content of the blood is from 30 to 75 per cent. higher in the tropics than in Europe. The seventy-five pages of their report are in parallel columns of English and Dutch. On change to a mountain climate (3,800 feet) the sugar content drops, but it returns to its former figure on return to near sea level. They found further that the sugar content of the blood always ran up, about an hour before a malarial chill and fever, and persisted high during the attack, but subsided anew just before the close of the attack. Quinin did not modify the sugar in the blood directly. They recently reported marked differences between the cholesterol content of the blood in the East Indies and in Europe, and they here refer to other findings which suggest that the calcium content

of the blood is unusually low in the tropics. Low calcium content usually pairs with hyperglycemia, and there is much to sustain the assumption that the infrequency of calcium deposits in the tropics in blood vessels or lungs has some connection with the high sugar content of the blood. They insist that the chemical intensity of the light is no greater in the tropics than in Europe, so the heat must be the main factor. It may act on the sympathetic system; this would explain the high sugar content, the low cholesterol content, and various other factors which enter into the process of acclimatization. If we accept this hypothesis of sympathecotony as an important element in acclimatization in the tropics, then it follows that measures to reduce the hypersensitiveness of the sympathetic system are required. Chief among these is the administration of calcium chlorid. With this can be prevented hyperglycemia and hyperthermia in animals given a drug which otherwise promptly sends up the temperature and the proportion of sugar in the blood. When the sugar content of the blood is increasing on arrival in the tropics, higher demands will be made on the kidney filter, and some of the sugar may be cast off in this way—a true renal glycosuria. Another way for the body to get rid of the excess of sugar is by combustion, and de Langen and Schut are convinced that the majority of cases of long persisting "low fever" in persons not acclimated to the tropics can be explained in this way. The "low fever" to which they refer is not a disease; not a single abnormality can be detected. The complaints are the same as with renal diabetes, and both yield to the same measures, namely, change to a cooler climate or administration of calcium. A sea voyage is a sovereign remedy for "low fever," but it has not been tried for renal diabetes, they believe. They emphasize in conclusion that persons inclined to renal glycosuria, the tuberculous, and those displaying sympathecotony, should be warned against settling in tropical regions, at least near sea level. On the other hand, a healed apical tuberculous process in persons of the vagotonic constitution need not be a contraindication to life in the tropics.

Hygiea, Stockholm

July 31, 1918, **80,** No. 14

132 *Fasting Treatment of Diabetes. P. Arnell.—p. 817.
133 Chylothorax in Tuberculous Boy. A. Gullbring.—p. 840.

132. **Starvation Treatment of Diabetes.**—Arnell's patient was an engineer of 50 who had had four attacks of diabetic coma within a year. Under the influence of prolonged fasting for four days and restriction of fat, the acidosis subsided, the sugar disappeared from the urine and slight tolerance for carbohydrates was regained.

Svenska Läkaresällskapets Handlingar, Stockholm

June 30, 1918, **44,** No. 2

134 *Spondylitis Deformans. G. Kahlmeter.—p. 169-405.

134. **Deforming Spondylitis.**—Kahlmeter was assistant for two years at an asylum for the aged and incurable, and he examined with the roentgen rays every inmate that presented the slightest stiffness or pain in spine or hip joint. There were twenty-three typical cases of deforming ostearthritis of the spine, and he further examined with the roentgen ray thirty-four cases at other institutions, and studied the roentgenograms taken for other purposes in 1,056 persons. The necropsy findings are shown in two colored plates, with fifty-six roentgenograms. Every one in two or three of the elderly presented the characteristic lesions, but they were extremely rare under 40. Four times more men were affected than women. The stiffness and pains do not seem to be associated with these processes, but to be the result of the weakening of the spine which always inaugurates the deforming osteoarthritis. The symptoms from this insufficiency of the spine may precede any pathologic anatomic changes. On the other hand, the characteristic pathologic anatomic changes may in time correct the insufficiency of the spine, and then there will be no further pain. He emphasizes that the process does not spread over much of the spine, and that the disturbances are remittent, so that the earning capacity may be only periodically impaired.

Treatment addressed to the stiffness and pains may include baths, massage, passive exercises, application of heat, revulsion to the skin and other antineuralgic measures. He found bed rest and local heat to the part of the spine involved the most effectual of all symptomatic measures. He explains the pathogenesis as the consequences of the displacement of the weight-bearing balance of the spine on account of some disproportion between the weight to be borne and the weight-bearing power. This assumption suggests the necessity for measures to restore the normal balance in the spine. This would not only relieve the subjective disturbances but it might arrest the further progress of the disease or prevent the development of the characteristic pathologic process. It can be accomplished by reducing the weight to be borne, or by strengthening the supports, especially the muscles that sustain the spine. Massage and gymnastics are useful for this. The strain on the spine may be reduced by change of occupation if it compels carrying heavy articles or bending over, or by reducing the body weight in case of a tendency to obesity (some of the clinical cases reported show the marked benefit from measures of this kind taken unconsciously), or supporting corsets may be worn. One of his patients was materially relieved by a leather corset. He was able to resume his work as a carpenter for a year and a half to date, free from all disturbances, but they return whenever he discards the corset.

Ugeskrift for Læger, Copenhagen

Aug. 8, 1918, **80,** No. 32

135 *Hematoma Impedes Delivery. E. Petersen and A. Tofte.—p. 1253.
136 Historical Sketch of "Cerebral Otorrhea." J. Møller.—p. 1264.

Aug. 15, 1918, **80,** No. 33

137 *The Abdominal Walls with Gynecologic Disease. S. A. Gammeltoft and G. Wiltrup.—p. 1291.
138 *Croupous Pneumonia. C. Lundsgaard.—p. 1308.
139 *Calomel in Treatment of Pruritus Ani. O. Hamburger.—p. 1316.

135. **Hematoma Impeding Delivery.**—Petersen and Tofte report four recent cases of a hematoma developing in the vulva or vagina in the course of a childbirth and preventing its completion. It was necessary to incise the hematoma and, after the child had been delivered, ligate the bleeding vessel when it could be found, suturing the incision to fully obliterate the cavity.

137. **Changes in Abdominal Walls with Mild Gynecologic Disease.**—Gammeltoft and a massage specialist call attention to the patch of tenderness in the abdominal walls that may sometimes be the only sign of latent disease below. They give the details of seventeen instructive cases of the kind. Palpation of the abdominal walls revealed changes in the subcutaneous tissue or the muscles, and by massaging at these points conditions returned to normal both in the abdominal wall and below. It is indispensable to palpate the abdominal wall itself in examining for disease in the internal genitals. If tender spots or palpable lesions are found, this shows the points where massage or other measures should be applied, and with this the patient's symptoms may subside completely. It is possible that the innervation of the tender patch is by a branch of the same nerve innervating the diseased area below, and the superficial tenderness is induced by reflex action from the lesion beneath. This persists after the deep lesion has completely retrogressed.

138. **Pneumonia.**—Lundsgaard describes the research and the clinical experiences at the Rockefeller Institute Hospital at New York, during his fourteen months of work there. He adds that croupous pneumonia seems to be less prevalent in Denmark and less fatal than in New York. The death rate at Copenhagen averages from 18.3 to 25.9 per cent. but it was only 13.1 per cent. for children between 5 and 15, and 20 per cent. between 15 and 65. Above this age it averaged 68 per cent.

139. **Calomel for Pruritus Ani.**—Hamburger states that several physicians have expressed their gratitude for the relief from long standing pruritus ani by his method of rubbing dry calomel into the parts. When the calomel is rubbed in well it sticks till the next day. In salve form, he reiterates, it cannot be counted on for such effectual service.

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(Continued on page 22)